

Australian Model Engineering

March-April 2003

Issue 107

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2003



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WORKSHOP, PRODUCTS, CLUB NEWS & EVENTS, REVIEWS

In This Issue: ☒ **Wombat** — The Building of a Steam Launch
☒ **Tranz Rail Loco DXR 8007** in 7.25" Gauge
☒ **Tipped Tooling** — A Few Pointers



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March-April 2003

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18 March 2003

March-April 2003

Issue 107

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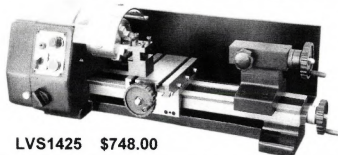
65 Classifieds

Front cover

Tom Miller's Rio Grande K36 is being driven by Dave Giles at Tom Miller's private railroad in the U.S. last August. The locomotive runs on Australian char and is an excellent performer. For more on Dave's trip to North America turn to page 30.

Photo: Tevor Heath

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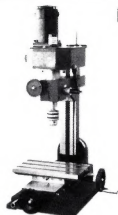


Stand

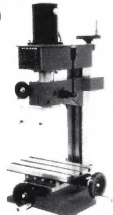
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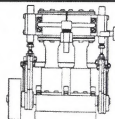
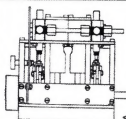
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Deadlines for issue 108

Club Roundup Mar 13

Letter Box Mar 13

Classified Ads Mar 28

Mailout Date Apr 24

Comment

When the chips are down

As I began putting this issue of *AME* together mid-January, I had no idea of the drama which was to soon unfold and which would have an influence on the final content of this issue, as well as making me take an unexpected view of my hobby. On January 8 as I was getting the material ready to start putting another *AME* together I was aware of the distant rumbling of thunder but gave it little thought other than "I hope there is some rain in that". Our last decent rainfall was in February 2002 so the countryside is extremely dry. However there was no rain but each lightning strike started a bushfire and in no time there was a chain of fires along the mountains stretching from Canberra into Victoria.

Over the following week and a half the fires took hold and smoke rising from the ranges was a common sight. The weather was hot and windy and we were aware that the firefighters were having difficulties as most of the terrain was inaccessible except by helicopter. Suddenly, last Saturday, around mid morning, the smoke really began billowing up and the winds increased to cyclonic intensity. The temperature was just under 40°C and the humidity level was under 4%. By lunch time the whole sky was black and a wall of flame over 100 metres high and kilometres long raced down the mountains and into the western side of Canberra. The rest, most of you would have heard, seen or read in the news. My home is on the western side of Canberra and fronts directly onto a large tract of bush. When we heard that a state of emergency was declared I shut down the *AME* computer (5 minutes before the power supply failed) and waited outside, hoses at the ready. Those of us adjoining areas of bush were on high alert as the authorities were worried that flying embers would start additional fires, which they did but not in our reserve (our main problem was a @#%& arsonist).

We were told to be prepared for evacuation. What do you take? Eventually we packed items like photo albums (irreplaceable), documents, toothbrushes and a change of clothes, plus a few odds and ends. What about my traction engine components or locomotive? Hard decision, but probably better to take the kids! Models can be replaced... but then again, they don't argue or fight... No, take the kids! Actually, it is an interesting experience when you have to look at your workshop from this unexpected point of view and assess what really counts.

As it turned out we did not have to go but we had four interesting days, three of which we were on high alert. The arsonist, who obviously thought the bushfires were not enough, started his own at the far end of our reserve but fortunately was spotted in time by a helicopter pilot who emptied his bucket on it. The electricity was off for a couple of days and all up I lost much valuable time in putting this magazine together. The result is that the content is not quite what I had originally planned as some items which required more time have been left for the next issue.

Finally, my sincere thanks to the many dozens of you who phoned to see if we were OK during the fires. It was really appreciated. Model engineers are really great people!

David

Join us in a great hobby!

If this is your first issue of *Australian Model Engineering*, welcome!

In successive issues we cover many topics centred on that wonderful process of model engineering — alias *tinkering*.

If you're new to model engineering as well as to our magazine, you'll benefit from getting together with other model engineers — we're good at sharing ideas and saving each other money! If you don't have any contacts, start by looking in Club Round-up to find a club that's near to you. Many of our readers have discovered people with similar interests literally just around the corner.

Helping other model engineers is the simple idea of the volunteers behind this magazine. Our readers write items for us — for the same (non-existent) rate of pay! If you have ideas, opinions or techniques that you feel would be interesting to others (especially from the newcomer's angle), please drop us a line. We can send you a useful guide and help with preparing artwork or editing.

I hope you'll enjoy the great fellowship that makes our hobby special, and that you'll support our advertisers — after all, they help pay our bills!

David Proctor

Managing Editor



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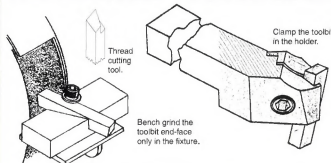
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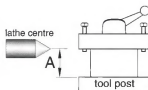
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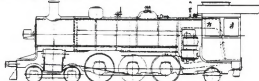


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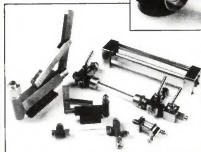
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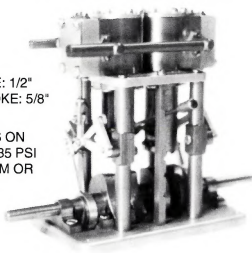
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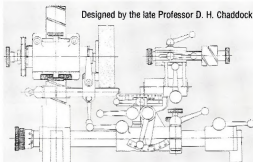
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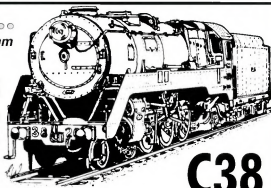
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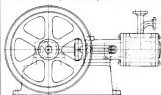
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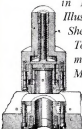
Soldering, Brazing & Welding - a Manual of Techniques [Pritchard] £20.50

Good book on all ways of joining metal together. Covered are soldering and brazing, albeit slightly briefly and then, in much greater detail, Oxy-acetylene, MMA, MIG and TIG welding. Most of the instructions refer to welding steel, but welding other materials and distortion control are covered in separate chapters, as is quality in welding. Recommended for those taking up welding, or as a reference book if you have some experience. 160 pages full of drawings, diagrams and photographs. Larger format paperback.



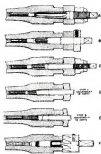
Punches Dies and Tools for Manufacturing in Presses [1931] [Woodworth] £24.45

A companion to the same author's book *Dies*, Their Construction and Use this book is *An Encyclopedia of Die-making, Punch-Making, Die-Sinking, Sheet Metal Working, and Making of Special Tools, Devices and Mechanical Combinations for Piercing, Punching, Cutting, Bending, Forming, Drawing, Compressing, Embossing, Forging and Assembling Metal Parts, and also Articles of Other Materials in Machine Tools, including Special Sections Illustrating and Explaining the Making of Carriage Shells, Wire and Bar Steel Drawing Dies, Press Tools for Making Hydraulic Leather Packing, the making of Paint and Chemical Tablets, Manufacture of Pens, Pins and Needles, Jewelry and Eye-Glass Die-Making, Spoon and Fork-Making Dies, Sub-Press Die-Making for Watch and Clock Work, Drop Dies, Drop Forging and Ornamental Die-Making. Get the picture? 538 pages choc-a-bloc full of information. 736 illustrations, the bulk being drawings. Paperback.*



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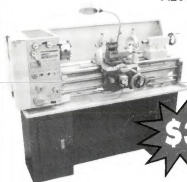
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Wombat — The Tale of a “Tailless”

by John Levers

A good friend and model engineer once said to me, “What next?” “What do you mean what next?” “Well, now you have finished the B.P. (Buffalo Pitts) you will be looking for your next project.” One thing led to another and I should have kept my mouth shut but “born with the gift of the gab” I put my foot in it and said that I should like to get away from wheels — wheels of any kind.

“OK” was the reply, “You need something ... like a boat.” “Yes — I need a boat like a hole in the head!”

So after a phone call approximately a year later, I was on my way to Mannum to look at a boat. No — more like a pile of green firewood on a boat trailer. The day was 12 January 1994. “She” was in an old shed at the back of the BP garage in Mannum and the bloke there said “Yes, for sale at \$500, take it or leave it.” Love at first sight comes to most of us only once in a lifetime. Murphy said for me twice — 10 minutes later, minus the old Robin two-stroke and a reduction in price to \$250 she was mine. Then to drag her back to

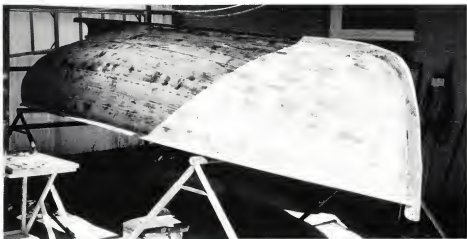


Photo 3

my friend's place at Mannum and stable her at his place. Yes, he did have horses!

Photo 1 shows the load of green firewood on a wooden trailer — no deck, 3 or 4 badly cracked and split planks but with propellor, rudder and a whole lot of fiberglass and resin holding her together!

For the next year I played with the Buffalo Pitts and built the launch engine, as I came to call it, in my spare time.

June and I visited my friend and his wife at Mannum several times over the next year whilst building the launch engine, but apart from a casual glance at the tub and trailer, didn't bother much about her till the eventful day arrived — “Would you get your firewood out of my back yard. We don't have horses any more and I want to clean up the place.”

The next day I really felt that I was a “boat owner” (photo 2). I wish I had never started! Two 260 litre wheelie bins of fiberglass and resin from the outside of the hull, mastic, silicone, putty, cigarette butts, cockle shells, chewing gum, etc. from the cracks in the planks (photo 3). 7 coats of paint on the inside, red, brown, green, blue, white, black striped and spotted! They were all there, but after some very delicate grit blasting — western red cedar and not a trace of wet or dry rot. What luck, eh, Murphy! (Photo 4)

To stabilize the hull I put on 40 litres of polyester and glass, on the inside so that any hull shrinkage would be minimal and then the “pleasant” jobs began. Yes? The engine is actually a Buffalo Pitts modified.

When I built the Pitts a friend had kindly plasma cut a couple of spare sets of sections from the relevant black mild steel, so the cylinder and steam chest are as per the traction engine. However, the valve gear and motion is pure Stephenson link. There are no castings in this engine of 2 7/8" bore x 4" stroke and there are no drawings either (photos 5 and 6).



Photo 1



Photo 2



Photo 4

The engine is an open column engine with a pair of columns on the diametral line of the cylinder with the crosshead between them. Therefore the piston rod is in parallel with the crosshead and is limited by the same. The piston is 25mm thick aluminium with no "normal" piston ring, but a 4mm Viton "O" ring with a 0.2-0.25 contact crush on the bore which is 75mm I.D. 304 grade stainless steel 16 swg tubing shrunk fit into the cylinder, so much

more hygienic — no corrosion, no wear, etc. The only thing in contact with the bore is the "O" ring. **Please Note — DO NOT use Viton for superheated engines, only for wet steam up to 200°C.** If anybody says Viton rings are no good tell them about my old Allchin *Royal Chester* in 3" scale with its aluminium bronze bore and Viton "O" ring on the piston. Prior to transfer to John Wiendehoff at Strathalbyn, SA the engine was estimated to have travelled Melbourne to Adelaide 2 times — over 10 million piston strokes. Except for two flats worn on the ring, which was still steam tight, there were no problems and no wear on the bore!

The crankshaft is mounted on 3 self-aligning ball races in commercial plummer blocks on a steel frame. Housed on this frame are the twin oil pump housing and totally variable water pump (boiler feed pump). The oil pump is split with one pump feeding cylinder oil to the steam chest and the other pump oil to each bearing of the crosshead slide ("sticky" or chain oil).

Supported on the crankshaft, via a ball race and carriage is the valve shift lever engaging in a stepped quadrant for forward and reverse. The valve gear is carried in a square guide for the valve push rod and the valve is plain running on the steam chest port face as per usual. The valve itself is from ASAB Supreme™ hardened to 55°- 60° RC and the valve face surface ground to a fine finish.

Most of the "bright gear" shown is 316 stainless steel, but things

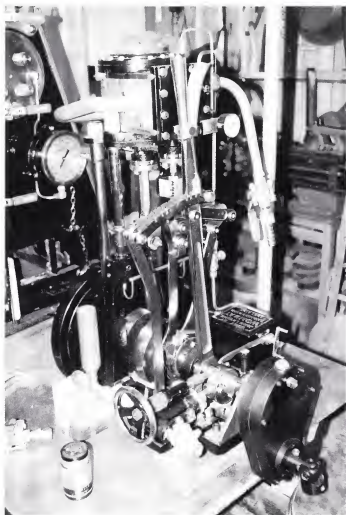


Photo 5

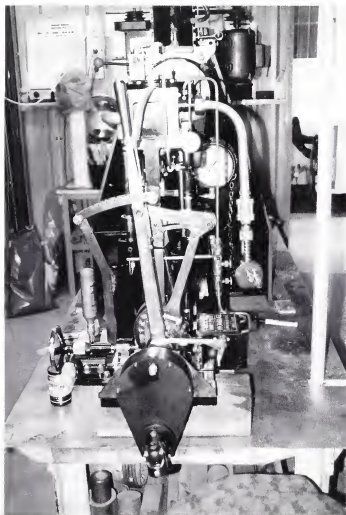


Photo 6

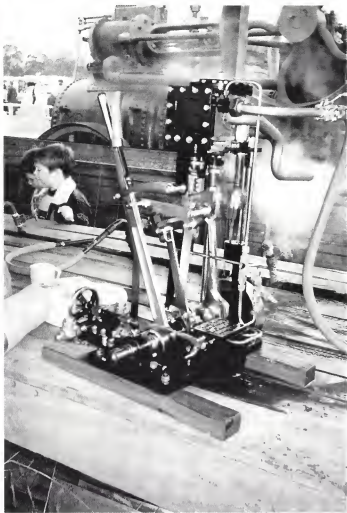


Photo 7

like the connecting rod are black mild steel with a flash of copper/nickel/chrome.

All stainless inlet and exhaust piping is glass bead blasted to give a good finish, all welding (TIG) being courtesy of a qualified welder son (William, many thanks).



Photo 9

The engine was run for 10 hours straight on air at 30 psi, then the first time on steam was at the Vintage Steam & Horse Rally at Echuca (Vic) on 7 June 1997 — what a buzz and no problems (photo 7).

Things went quiet for a time — I lie — we moved house after my redundancy from the C of A and moved of all places to a place where we could "play boats" — Mannum. The old girl had come home, and after 2½ years of house building and gardening, time to let the ulcers unwind — back to *Wombat*.

There are 11 planks each side of the hull, therefore 22 seams at 15 feet long to be re-caulked using SikaflexTM urethane sealant. If anybody can hold a beer after re-caulking 340 feet of seams in 2 days, I take my hat off to them! But that was only the beginning, there was no deck!

I had come across a trailer load of old (70 years) jarrah and red gum floor boards for the price of a slab of beer. 3 weekends later and God knows how many nails later I had the makings of deck timber.

A friend who made rustic furniture, for the abovementioned price reduced this load of floor boards to 30mm x 12mm "planks". These planks, all 256 of them set at 45° to the centre line of



Photo 8

SHEET 0.

STEAM ENGINE MKI

YARROW STYLE WATER

TUBE BOILER. BAL

COPPER, CONST. SILVER

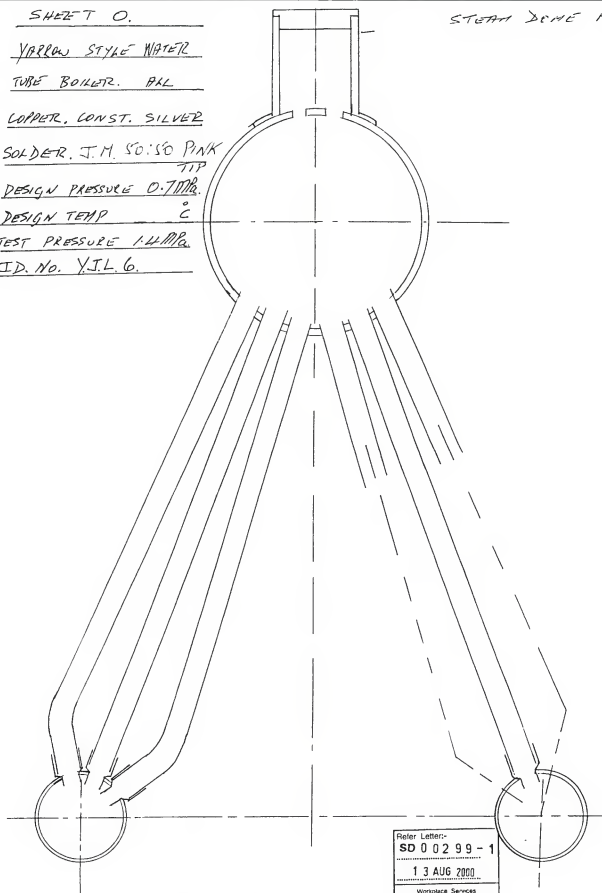
SOLDER. J.M. 50:50 PINK

DESIGN PRESSURE 0.7 MPa

DESIGN TEMP °C

TEST PRESSURE 1.4 MPa

I.D. NO. X.I.L. 6.

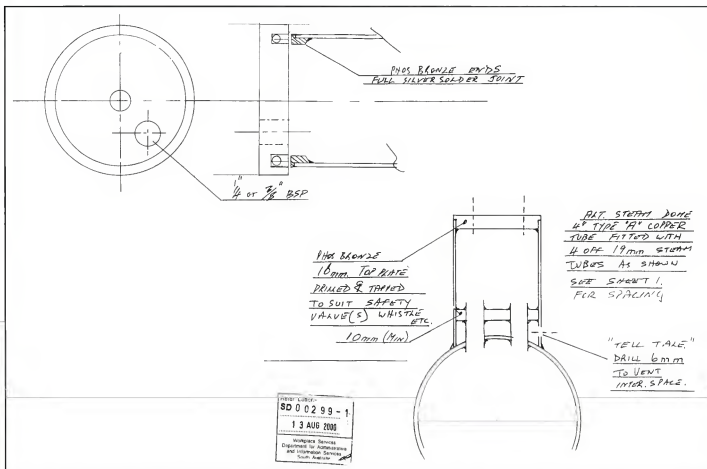


GENERAL ARRANGEMENT SHOWING TUBES
DRUMS & HEADER STEAM TAKE OFF



Sheet 0

20.7.00



Sheet 6

the hull and "wrapped" around the stern and down the transom (photo 8), completed the boat hull. Each plank has a 3mm black pin stripe of sealant between it and its neighbour (photo 9). If anybody can hold a beer after caulking that lot over 3 days I take both my hats off to them! The deck was progressively sanded to generate the required top surface and then sealed with linseed oil (boiled) and driers (4 coats). The hull had settled down by this time and any slight cracks, etc. were gouged out and sealed and sanded back.

A visit to my bank manager confirmed that painting the hull was in order and twin pack polyurethane marine grade was applied over a "high build" epoxy primer. Four litres of epoxy and 6 litres of urethane, not to mention thinners, a spray gun, etc. came to well over \$1,000 — it makes your head spin!

I now had a hull and an engine but no power generating plant. What to do next?

During the '94-'97 period I had dabbled in the designs for a vertical water tube steel boiler to Australian Standards and built one with a design pressure of up to 200psi and went through the tedious but necessary process of dye penetration and magnetic particle analysis, hydrostatic test and general inspections during manufacture and I ended up with a very good boiler, but no good for *Wombat*. Too big, too heavy, but would be fine for a 22'-24' launch and as such this unit is for sale, complete with all paperwork, etc. So back to the drawing board. The second boiler was not started till April 2000 and after a lot of investigation re old water tube designs, settled on a British Admiralty Yarrow 3-drum type — fast steaming, low water volume, large surface area for heat input, big fire grate and overall the unit was in materials to hand and methods of construction very familiar to most steam freaks.

The design is based on values obtained by using mathematical design ratings from the Australian Standards for steel boilers (both water tube and fire tube types). The main consideration is of course that the ultimate tensile strength of copper at the design pressure/temperature must be used throughout the calculations.

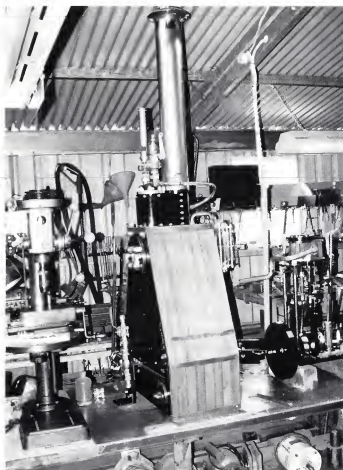


Photo 10

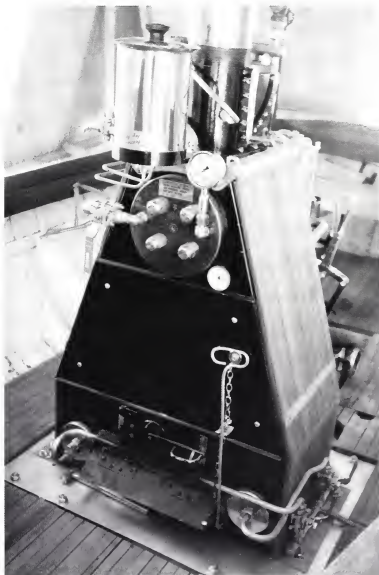


Photo 11

However Australian Standards have a lower limit of 200°C and as such this limit is the overriding factor and of course must be used.

Therefore, even though the design pressure is 0.7 mPa and the test pressure is 1.4mPa, the design temperature is 200°C and at 200°C the UTS of copper is 54mPa (some literature may quote 57mPa).

Some observers may have noted that the design pressure has been halved to 0.7mPa from the original steel design. It's all to do with the propeller fitted to the boat. The propeller is similar in its power transmission to an automotive torque converter in the auto transmission of cars — the faster it revs the better the power throughput. Not quite. Propellers are at all speeds constantly losing some of the available energy in slippage, cavitation, stream turbulence and a host of other more minor phenomena. So even if the engine/prop system was able to use even 50% of the energy of a boiler capable of steaming at 200psi, the size of the prop is limited to the gap between the keel and the skeg. In my case 14", so a "doctored" 14" dia. 3-bladed prop but with a 17" pitch to give as much bite as possible. I tried several props from 10" to 18" pitch before I found my own 14" x 17" at a country Sunday market, brand new, unborred for \$30 — "Quick, June, let's go home before he changes his mind!" With this propeller fitted the boiler/engine/prop system has turned out very satisfactory for *Wombat's* hull shape and weight, more later.

So back to the boiler design. It is possible to calculate the theoretical evaporation rate, at 0.7mPa (167°C) of water and relate this to a demand at the engine to maintain a certain engine speed. However, mechanical and thermal losses make this determination

very much hit or miss.

With already having a long and very friendly co-existence with my Buffalo Pitts traction engine I had a good idea of what its cylinder and valve gear were capable of if married to a very free steaming boiler. So some basic design requirements were:

1. Large surface area
2. Large fire with a useful depth — no ice cream wafer fires
3. Low overall weight
4. Low water volume, don't want to waste good sailing time waiting for the kettle to boil
5. No corrosion problems — too much salt in the River Murray from NSW, Vic, and Qld already.
6. Easy access for inspections and maintenance
7. High value thermal insulation in the cladding, don't want to lose too many calories.

The boiler as described previously is a Yarrow 3-drum water tube fitted with a steam header (dome). The top drum is nominally 200mm Ø x 345mm long. Wall thickness is 5mm and 2.03mm respectively. There are fifty two 19mm Ø x 1.6mm wall water tubes each 550mm long arranged into two banks of three each side of the 300mm wide x 300mm deep firebox. The firebox has flame guards running front to back so that fire cannot be built up directly onto the outer wall of the bottom drums.

There are no external down-comers in this design, the tube arrangement being such that the outermost wall of tubes is shrouded from direct radiant heat and relies on convective heat from the products of combustion.

Within 3-5 minutes of lighting the fire the top drum is too hot to touch and the bottom drums are not far behind. On a normal fire-up it takes approx. 12-14 minutes to have the boiler lifting the safety valve, all this on natural draughting up the funnel!

In the overall design arrangement (**sheet 0**) the 19mm Ø water tubes are shown nested into the bottom drums via 19—12mm Ø reducers.

In the calcs, if the ligament efficiency is found using a hole diameter of 19mm the efficiency is too low and compromises the "inbuilt" safety factor for drum wall thickness. By having the hole at 15mm the ligament efficiency is significantly raised and therefore the safety factor is not compromised. 19—12 Ø standard copper reducers have 15mm Ø at the small end.

The overall surface area available for heating is over 2.35 square metres.

The end caps for both top and bottom drums are from gunmetal LG2 (leaded bronze) and are "floating" on the drum ends. Viton "O" ring seals do the rest and the whole assembly (two caps and seals on the drums) is held by tie bars of 12mm Ø 400 Monel and blind hex nuts of 316 stainless steel using again Viton "O" rings as seals.

The boiler element was silver brazed using Johnson Matthey 50:50 pink tips which has excellent corrosion resistance and is ideal for 2 stage brazing — if I found a leak I didn't have to fuse the first application. I could use Easyflo 45 light blue tip to "caulk" the job. You will not find any 45 in my boiler!

The cladding, cut and folded as shown in several photos (including **photo 10**), is from 2mm galvanized steel with 25mm thick ceramic blanket as thermal insulation. The steam header is from 100mm Ø copper and is fed from 4 riser tubes as shown in the drawing. This is a very good way of mounting a header and no compensating plate is required as the hole spacing for the 4 feeds is at least equal to the spacing for the water tubes.

Steam take off for the engine, safety valve and whistle is via a 3-port manifold fabricated from 316 stainless steel, TIG welded, screwed directly into the top plate of the boiler.

A quick tip — when screwing taper BSP or NTP male threads into a plate always try to tap the female thread using the corresponding TAPER tap, it always makes a better seal and is almost impossible to strip the thread by over tightening.

This boiler design is registered and verified by Workplace Services, Dept. for Administrative and Information Services, South Australia, and I wish to acknowledge their assistance to me in all my efforts.

The boiler and engine are mounted on a load distribution plate which is in turn bolted down to the hull bearers situated amidships (**photos 11 and 12**). Between these three bearers, under the plate are two 20 litre shaped condensate tanks fed from a return flow condenser, river water cooled, which accepts the exhaust steam from the engine, condenses the same and drops it into the two tanks. By controlling the cooling water flow the condensate is produced at about 60°C and therefore a significant fuel saving is obtained.

The fuel used is Morwell Char from Victoria, but due to its price and the relative scarcity in South Australia, I "dilute" it by burning very dry well-seasoned red gum or mallee timber cut into 50mm square x 200 long (max) faggots.

Running the boiler at 75-90 psi and a steam chest pressure of 20-25 psi (fluctuating during the stroke) with the engine RPM at 125, propeller RPM 250 gives a cruising speed of approx. 3 knots (5 km per hour plus). As can be seen in the general engine photos, final drive is through a "black box", a 1:2 step up chain box, duplex chain and sprockets, courtesy of Mitsubishi and the local auto wrecking yard.

When the original pile of green firewood on a trailer was purchased, close inspection of the "goodies" lying in the bottom of the hull revealed several cross hull seats, floor boards, old ply deck sections and underneath all this, wrapped in a piece of old canvas sail, two 3-bladed props, prop shafts, bronze deck fittings, 2 rudders (broken) and other odds and sods, i.e., a house brick, a door mat, a length of anchor chain, but no anchor!

The seating timber, when stripped of its green paint, was like the hull — western red cedar, and when the green paint and fiberglass resin was cleaned off the two rudders, enough very good timber was available to fashion a "new" rudder.

A word of warning to anyone who might resurrect a "Wombat" — always wear eye protection and breathing protection because old dust and wood paint can be very harmful in the long term, eye ulcers or emphysema or worse. Medical science has recently discovered that sanding fibreglass resin produces a dust which is almost as hazardous as asbestos dust! Please take care.

These literary ramblings have, I hope, taken the reader through some of the troubles and lots of the joys of a steam project. I know that this one is a 12'x1' type but is only on the same scale as a 14" Ø boilered 7³/₄" gauge locomotive and mine floats and has no flanged wheels.

Please refer to the photo showing "WOMBAT ERL". The first replies re the "translation" ERL win boat trips at Mannum.

There is an unsung design engineer, come coffee maker without whose help this project would not have come to fruition — Thanks, June.

Finally, I would like to make known my sincere thanks by dedicating this to a good friend and model engineer, Mal Horton of Mannum.

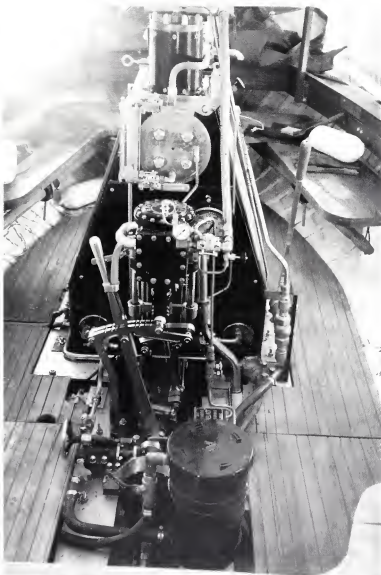


Photo 12



The author and wife, June, in their "backyard". John says "I am now 27kg slimmer than when this was taken"

Universal Test and Demo Stand for Locomotives — part 3

by Peter Dawes

Drawings for publication from the author's originals by Rex Swensen

(I omitted to include this first segment in an earlier instalment. My apologies for any inconvenience ... Ed.)

Notes to Accompany Drilling Plan for Frames

The drilling of the 'frame plate' has to be done in specified stages. Builders can choose whether they want to drill the single sided holes first or later. There are five single side $\frac{1}{4}$ " holes, all on the LHS. There are fourteen #25 holes on the LHS and eight on the RHS side. Some require a $\frac{1}{4}$ " locating hole to be drilled first. All other holes are $\frac{1}{4}$ ".

1. Make and have ready the two 'axlebox yoke guide frames'.

2. Mark out the LEFT side 'frame plate' as per the drilling plan, then clamp the two frame plates together back-to-back. It is important that they are clamped flush along the top edge because this is the main reference edge.

3. The first step is to drill the six $\frac{1}{4}$ " 'bolt' holes so the plates can be held together for finishing the back-to-back drilling. There are three holes at the top that are used temporarily to hold the two plates together. Later they are used to hold the plate to the 'axlebox yoke guide assembly' after the square tube on that frame is drilled and tapped $\frac{1}{4}$ "W. The top three bolts will eventually be fitted from the inside. This is so that they do not show on the outside of the machine and where they would interfere with the side covers. The three at the bottom are drilled right through $\frac{1}{4}$ " for nuts because they are not obvious and do not foul anything else.

4. Bolt the two frame plates together with the six $\frac{1}{4}$ " bolts and nuts. Remove surplus clamps. Now drill all remaining back-to-back $\frac{1}{4}$ " holes, noting that the four middle stub axle holes are in the LHS only, and while it doesn't particularly matter if they go through the RHS it is better to drill them separately. The same applies to the hole in the top left rear corner which is later to be tapped $\frac{3}{16}$ "W. This is for the thumbscrew that locks the left rear station post in its socket (the other three stanchions are locked with screws from the ends. This one is different in that the shaft of the chain tensioning screw goes right through the socket and the station post is slotted fore and aft in its lower half to straddle the screw). Do drill the $\frac{1}{4}$ " holes for the front idler shaft and 1:4 speed reducing shaft because they go through to both sides. Do not enlarge these two yet.

5. Now with the 1" hole saw enlarge

the holes at the ends of both slots. Optionally drill some intervening $\frac{1}{4}$ " holes and cut out more of the metal with the hole saw to reduce the amount of milling (milling cutters are more expensive and blunt more quickly than hole saws). The slugs produced from these drillings are also useful because they provide thick washers needed later.

6. If not already separate, separate the two frame plates.

7. Drill the four $\frac{1}{4}$ " holes for the stub axles in the LH plate only and drill the hole for the thumbscrew in top LH rear corner.

8. Make a drilling jig with a $\frac{1}{4}$ " spigot to spot the holes for attaching the inboard axleboxes for the front idler shaft and for the optional 1:4 reduction shaft. For each one there are 4 holes #25 (3.7mm) on a 25mm circle. These axleboxes are held with four 4 x $\frac{3}{16}$ "W bolts. Drill initially #25 but later open them out or tap them in order to bolt from whichever side is easiest or appropriate. Use the template to spot the holes in both the frame and the axleboxes. Bolt from outside with threads in the axlebox is preferable as it gives a longer and stronger thread, but it can be the other way round if necessary.

Even if the speed reduction shaft is not fitted now, drill the holes for its axleboxes anyway in case it is decided to add it later.

9. Open out the $\frac{1}{4}$ " holes for the front idler and the 1:4 speed reduction shaft to $\frac{7}{8}$ " and $\frac{3}{4}$ " respectively.

10. Mill out the remaining intervening metal in the two slots, the plates can be separated or bolted together for this job. Separate the two frame plates if not already separate and working on one side at a time, bolt the axlebox guide frame assembly onto the frame plate and spot the top three 'bolt' holes into the yoke frame #25. Tap and add the bolts. It is important that the top face of the yoke assembly frame is exactly flush with the top edge of the plate. The rail inserts must lie flat on this face.

11. With the $\frac{3}{4}$ " hole saw enlarge the three TOP SPACER holes in the OUTER side of the SQUARE TUBE in the RHS axlebox yoke guide assembly ONLY, so that it will clear an undersized $\frac{3}{8}$ "W nut. It can be removed from the plate for this if necessary. The detail is shown in the drawing of 'top spacer assembly'.

12. Drill and bolt the $\frac{1}{2}$ " x $\frac{1}{2}$ " 'foot angles' to the plates so that they are flush with the bottom edge of the plate.

13. On the LEFT frame assembly ONLY and with the foot angle added, perform the second step shown in the table 'Procedure

for drilling holes for stub axles' - enlarging the $\frac{1}{4}$ " holes to $\frac{7}{8}$ " which effectively notches the two angles, BUT do not cut into the plate. There are four holes for four stub axles.

14. Then carry out the third step by opening out the same 4 holes to $\frac{1}{2}$ ". These holes are now ready for the stub axles.

15. Make and fit the chain tensioning slide assembly to the LHS frame assembly, ensuring it is aligned parallel to the frame and at the correct height. Drill the holes for it #25 for tapping $\frac{3}{16}$ "W because they will probably need to be bolted from the inside. (Builders can substitute 2BA or 4 or 5mm for $\frac{3}{16}$ "W but I find that stock Whit. bolts and screws are the cheapest).

That completes the drilling of the frame plates and the main side attachments. Drilling and tapping for the end fittings is best done when the frames are assembled.

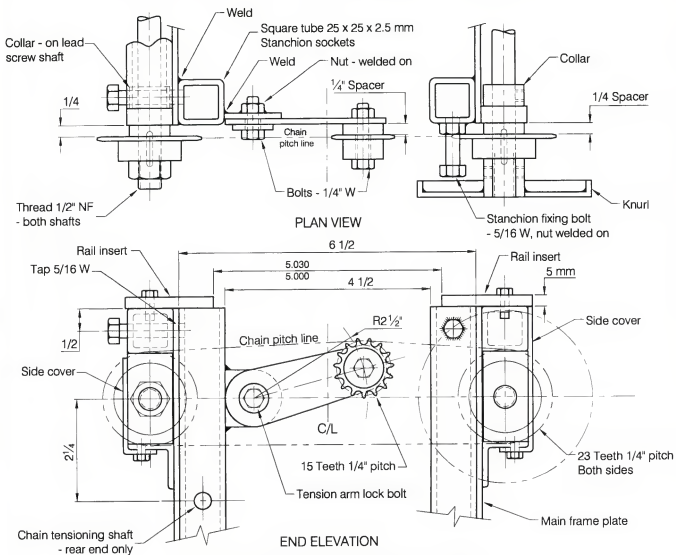
Use as a construction stand Support table

This usage requires some sort of table so I built a table for my machine to allow it to function as a construction stand. However if a ROTATING STAND is required readers should see author's earlier article in *AME*, No.61, p.29, July/Aug. 1995. There have also been other articles. Rotating stands must have minimum overhang because the loco is suspended in the middle, so they tend to be built for specific locos and while mine was highly flexible allowing left and right side, and upside-down working, it was always pretty much loco-specific as far as length and fixing were concerned.

This UTS is good for working on superstructure after the chassis is complete. It's not convenient for underneath working on account of being so deep.

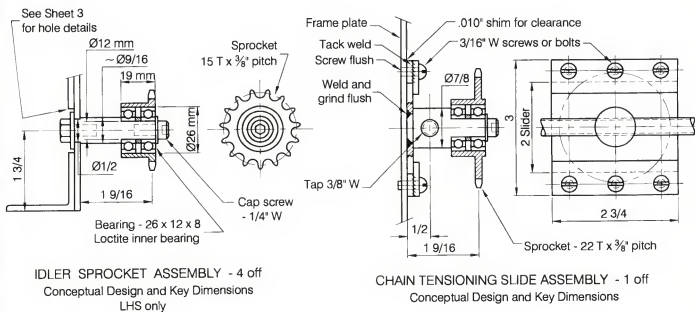
My table is made of 38 x 38 x 2.5mm ($\frac{1}{2}$ " x $\frac{1}{2}$ " x $\frac{3}{32}$ ") square hollow section pieces just butted up and welded to each other all round. It's so strong it needs no bracing. It's 48" long, 21" wide by 36" high and has a shelf supported by two $\frac{1}{2}$ " x $\frac{1}{2}$ " x $\frac{1}{8}$ " angle iron crosspieces bolted onto the legs at the ends. Three of the legs are 36" long. The fourth is 2" shorter to allow for an adjusting foot. The shelf itself can be particle board for lightness but that cannot support a heavy load without bending. Or it can be tongue and groove hardwood (cypress pine) flooring for a very strong shelf that will support any load you care to put on it and won't need intermediate support.

The shelf is set at a height of 24" from the floor (which happens to be just the right height to store the compressor (and/or



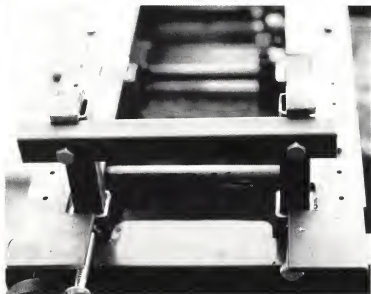
DRIVE ARRANGEMENT - AXLE BOX LEAD SCREWS

Required at both ends

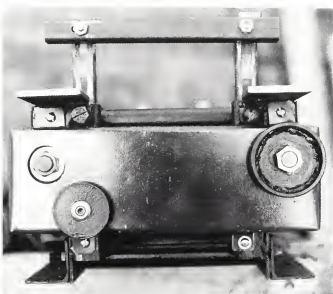


Not to scale

UNIVERSAL TEST AND DEMO STAND FOR LOCOMOTIVES - Sheet 4



View of front end with stanchions raised and crossbeam installed



Rear end view with cover stanchion installed

welder) underneath. The shelf catches bits and pieces that might drop while working on the loco, as well as providing a convenient tool and parts shelf.

As an aside, if a table such as this is covered with a flat 10mm thick steel plate overhanging all round by about 50mm, it makes an excellent welding and general purpose metal working table.

Three of the legs are fitted with 38 x 75 x 5mm flat feet welded on to provide broader feet than the ends of the tubes can provide. The extra length should point outwards for that little extra bit of stability. The fourth leg has an adjustable foot. A 10mm thick x 38mm square piece of steel is drilled 10.5mm and tapped $1/2"$ W. It is then welded square onto the leg, which is cut shorter than the others by about 2". The foot itself is made from a small square or circle of steel to which a $2 1/2"$ x $1 1/2"$ Whitworth bolt is welded upright. To ensure the bolt stays true during welding, clamp it endwise to the foot in the vise. This arrangement gives about $3/4"$ of adjustment, enough to keep the machine stable on an uneven floor.

If preferred, the projecting part of the feet can be drilled and bolted down with Dynabolts® or similar.

Making the table is a job where a good abrasive cut-off saw shows its worth. The cuts in the tube are clean, square and amazingly quick and easy! All the parts go together without hassle. While you still need to clamp joints firmly to hold the angles during welding, it's all that much easier when the parts come together at right angles automatically. The table took me only a day to make. The painting took twice as long.

Motor drive

The front idler (input/output) shaft can be fitted with a pulley or sprocket either inboard or outboard. It will depend on the particular motor used, and how it best fits. It is left to the builder to work out the details for a drive. One of the best places for the drive is internally and driving from be-

low, mainly because there are fewer obstructions. Driving it from the end of the machine is possible but difficult on account of the two end spacer tubes and the small chain assembly. An underneath drive gives more freedom.

On the other hand, if you want the UTS to sit on a flat-topped table without projections underneath, the motor can be located on the right hand side flush with the bottom of the stand with the drive going to any one of the three shaft extensions. The front idler sprocket diameter would also have to be reduced somewhat so it doesn't project underneath.

For the cheapest and smallest unit, a windscreen wiper motor or large car or truck heater fan motor could be used. These are certainly cheap. Either would be used with a 12V transformer and rectifier supply, (or even a large 12 amp battery charger!). Variable voltage control would control the motor speed. A windscreen motor drive complete with worm reduction box could fit inside the front end of the test stand.

With a PWM controller the speed of any brush motor can be varied over a very wide range and reversing is also simple. (The *Australian Silicon Chip* magazine has published designs for both types of speed control. The kit for a phase control costs \$50 at Dick Smith stores and the PWM controller is about \$100). Speed can be adjusted from zero to full just at the turn of a knob.

Speed reduction units

A word of caution with regard to worm drives:

They are attractive because they provide a large speed reduction with torque multiplication in a small space. They also turn the direction of the drive through 90 degrees, which can be useful in a long narrow space. But they have one serious failing for this application. The drive direction cannot be turned around! If "passive mode" is also required with the loco driving the test stand, the worm box must be taken out of the gear train. That means using two

distinct drive systems, so only contemplate a worm reduction drive if confining the use of the test stand entirely to Demo mode.

Motor options

Note that an induction motor with four poles has a speed of 1450rpm so that to even get down to one rev per second at the wheels of a loco on the stand requires a reduction ratio of 25:1. I am ignoring the slight step-up of 22:20 from the front idler shaft. Without a worm reduction, that can only be achieved with two or three stages of belt or chain reduction. While speed control of the motor can ease this somewhat, it still requires some reduction by belt or chain, if only to get torque multiplication.

There are three main options with regard to a motor drive:

A. When the machine is to be run constantly and for long periods of time (such as in Demo mode), then a 240V induction motor drive with some sort of speed reduction would be the best, cheapest, and the most reliable drive, provided variable speed was not required.

For variable speed with an induction motor, a variable frequency 3-phase inverter is required. These are quiet, durable, and reliable drives — but very expensive. Most modern 3-phase 415V motors can be readily wired 240V "delta" for the controller so that's not the problem. Older motors may have to be taken apart to find the "star" connection and the leads brought out to wire it up in delta. There isn't space to go into detail on that subject here (but see Curtis ref.).

Small inverters can run off single phase (the larger ones all run on 3-phase input). They first rectify the power and then actually recreate (synthesize) three new phases at the chosen frequency (and 240 volts in the smaller sizes or 415V in larger ones).

The problem with them is not the motor but the cost of the controller and unfortunately we cannot make it ourselves. All the circuitry could fit on a board about 150

x 100mm or less but it is hi-tech and no circuit has ever been published to my knowledge. Note that they cannot double as generators, unlike the next two options:-

B. The second and generally cheaper option is a DC motor (i.e. a brush motor). There are two types and two voltage ranges. The two voltage ranges are "low" — 12 to 48v, and "high" — 110 to 240v. If it is a wound field motor it can be switched to "generate mode" just by adding a DC supply to power the field winding. That means it can act as either a driver or a load for the loco, and by monitoring generated voltage and current it becomes in effect a dynamometer, or at least the main component of one. The significant unknown parameter is its efficiency as a generator.

If the motor is operated in shunt configuration, which gives a more stable speed but a lower starting torque, the field voltage should be reduced and controlled with a variac. If the voltage is also rectified, metering can be by means of simpler and cheaper DC meters, otherwise AC meters are required.

C. The third and probably best choice for a dual function machine is a low voltage permanent magnet (PM) DC motor. These have similar characteristics to a shunt DC motor — fairly constant speed with less load dependence than series winding — but with one extra advantage. The field is built-in. That is, it doesn't require external excitation, but then neither is the field variable. It will act as a generator if driven and if the armature winding is connected to a load of appropriate resistance. It lends itself very well to a dual purpose machine, easily convertible from "driving" to "driven".

These motors can be very efficient. Indeed, I'm told that some of those used in high performance solar cars approach 98% efficiency. They should be just as good as generators. They are certainly the best option if you can get hold of one of a suitable size and if you can pay the price. They are expensive. They are available in horsepower ratings ranging from 1/4 up to 1 or more.

While you can vary the speed of an induction motor to some extent by reducing the voltage, this is only achieved by increasing the "slip" and that is a flawed technique that's definitely not recommended. There

is also the centrifugal switch to complicate matters. The motor is likely to "slip a pole" and stall before cut-out speed is reached, but that is no consolation.

So the rule-of-thumb is:-

To vary the speed of an induction motor vary the frequency and/or number of poles, and to vary the speed of a brush motor (AC, DC, series, shunt or PM), vary the voltage (or power).

There are also three ways to vary voltage (or power). The simplest is a Variac auto-transformer for AC and a transformer-driven rectified variable voltage supply for low voltage DC. The speed regulation is fair, being particularly load dependent in series configuration. To improve matters it is necessary to use some sort of feedback signal to provide automatic regulation.

The second is variable phase control with back EMF feedback during the "off" part of the cycle. (Light dimmers usually work via phase control but without feedback).

This gives very much better control. But it suffers from hunting or "cogging" at low speeds and loads because the minimum pulse needed to keep the speed correct is too large. So it alternately over-speeds and then slows down. At higher loads and speeds cogging disappears. Most portable drill speed controllers are phase controlled with some sort of feedback.

The third and best is PWM or pulse width modulation with feedback. Cogging may still occur but it is minimal and only likely to be seen when the machine is running very slowly and very lightly loaded.

For a variable voltage power supply for a low voltage motor up to 24 volts and 20 amps see **Appendix 3**. Ref: Walters, R. in Silicon Chip.

Dynamometer mode

This subject is vast, so is well beyond the scope of this article. However some brief notes are offered.

Dynamometry is going to require some accessories and extra fittings:-

1. A drawbar pull strain gauge.
2. A stopwatch
3. A revolution counter on one of the main axles (but not the drive idler shaft since it revolves at a slightly slower speed, 10/11th to be exact). This can be a me-

chanical, optical, or magnetic sensor counter.

4. An ammeter and voltmeter with appropriate ranges for the power measurements. Digital readout meters (DVMs) are good for voltage measurement by reason of accuracy and versatility. However they are limited as far as current is concerned, and a special high current DC ammeter (say 50 or 100 amps DC) of better than 5% accuracy will be needed, preferably with a couple of ranges, say 0 to 10 and 0 to 100.
5. A substantial brake, either a drum and band, or disc and calipers to provide loading (see the Shellshear ref.) OR:
6. A generator to provide the load, in which case there must be a large wattage resistor to dissipate the power generated — and it must be one that is capable of being run continuously. Assuming 12V and 375 watts (nominal 1/2 HP) the resistor's current rating would be 40A. We are talking about something with the size and dissipation of a domestic single bar radiator, but note that the resistances would be very different — only about 1/4 to 5 ohms in the case of 12 volts. A multi-position switch controlling the amount of resistance in circuit would allow the load to be varied. If the generator is a 240 volt type then safety must also be a major consideration with all the wiring.

Some formulae

Use appropriate units throughout.

N = No of revolutions of rollers, **T** = time, **W** = work, **P** = power, **C** = circum, of rollers, **D** = distance travelled, **d** = diameter of rollers, **S** = speed, **F** = drawbar pull, **E** = efficiency of generator as percent, **A** = amps, **V** = volts. We do not concern ourselves here with the overall thermal efficiency of the loco itself — that is, its ability to turn the energy in coal into tractive power. We leave that to IMLEC.

The calculations begin by finding the circumference of the rollers;

$$C = \pi \times d \dots\dots\dots 1$$

$$C = \pi \times 4.485 = 14.090 \text{ inches}$$

$$(1.174 \text{ ft}, 357.9 \text{ mm}) \text{ for this machine.}$$

$$\text{"Distance travelled"; } D = C \times N \dots\dots\dots 2$$

$$S = \text{distance travelled in measured time}$$

$$= D/T \dots\dots\dots 3$$

$$W = \text{force} \times \text{distance}$$

$$= F \times C \times N \text{ OR } F \times D \dots\dots\dots 4$$

$$W \text{ also} = \text{Amps} \times \text{volts} \times T$$

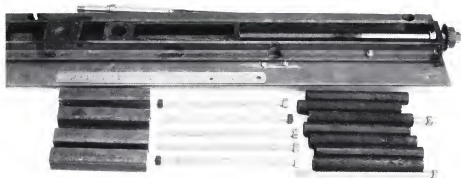
$$\text{Power (used or produced)} =$$

$$\text{work/time} : P = W/T$$

Integrating power with respect to time yields watt hours. The electricity meter in your meter box is a watt-hour meter.

Power can be measured either mechanically, or electrically.

Finding the efficiency of the generator will be the main problem in the case of the electrical version. Calculations can assume 95% efficiency in the transmission (chain drive) if the bearings are warm enough for their grease to reach low viscosity.



One side-frame, 12" rule, 7 x tie rods and spacers. Axlebox adjustment shaft installed

$P = \text{amps} \times \text{volts generated} \times 100/E$
 i.e. $P = AxV \times 100/E$ (electrically).....5
 or $P = \text{force} \times \text{distance}/\text{time}$
 $= F \times D/T$ (mechanically).....6

It is important to remember that all measurements will be subject to error if the key parameters fluctuate during the measurement period. This applies especially to drawbar pull, and to current and voltage measurements. Continuous integration of the values would get around this but that requires complex electronic calculation and equipment. A practical alternative is for a number of readings to be taken at frequent intervals, especially while the values of current, voltage, drawbar pull seem to be fairly constant. Calculate the mean for each parameter.

Using the machine

Preliminary adjustments

Before using it for the first time, the centre axle must be set exactly square with the longitudinal axis of the frame of the test stand. If all the marking out has been followed, it should be correct with a $1/8"$ shim inserted in the LHS centre axlebox space. If not, adjust by shimming on the side opposite the screw. Finally tighten the screw and its locknut.

To check that an axle is square to the frame use a large try-square with one limb against the frame and then carefully sighting the highlighted edge of the axle against the other edge.

Next, the front and rear rollers on each side (leading and trailing coupled axles) must be aligned with the middle one. In other words, so that they are all at right angles to the frame and parallel.

To adjust tracking on a system with keyed sprockets, undo the small pitch chain at the appropriate end by slackening its tensioner. Slip one or more teeth on ONE sprocket, maintaining the same position on the other. Facing an end, turning the adjusting screws clockwise widens the W/B and vice versa. Turn the screws in the direction that corrects the misalignment. Some backlash is inevitable and must be allowed for.

If using the 20 tpi UNF screw and 23T sprockets, the smallest possible increment

Some loco dimensions @ $1\frac{1}{16}"$ scale, (approx. inches)

Parameter	C36	C38	D50-55	Blowfly
Footprint	4-6-0	4-6-2	2-8-0	0-4-0
Len BB to DB	38	45.6	38	29
BB to 1st AX	15.5	16.5	12	9.25
1st WB	6.5	6.5	5.5	8.5
2nd WB	8.5	6.5	5	-
3rd WB	-	-	6.5	-
Hind AX to DB	7.0	16.3	9.0	11.125

(BB=buffer beam, DB=drag beam, AX=axle, WB=wheelbase)

in W/B (one tooth on the sprocket) can be calculated. It is:-

Pitch of adjusting screw divided by No. of teeth, or .05/23 or approximately .002".

These adjustments need only be done once.

Setting up for a loco

To set up for a loco, if it's a 4 axle engine decide which axle is to be the middle one on the test stand, and base all measurements from there. That also fixes whether the idler goes at the front or the rear. Remember that there's more space for it at the front.

Bolt the two 4th axle assemblies onto the frame at the proper W/B distance. The slotted holes allow fine adjustment.

If it's a two axle engine decide which pair of axles on the stand are to be used. The rear pair give the largest possible wheelbase of $9\frac{1}{2}"$.

Start by slackening the chain slightly — a couple of turns is plenty and removing the rail inserts. If the W/B is already near the middle of its adjustment range then moving to either end will take up extra chain. If at an end already, moving to the centre will generate slack so that some loose chain needs to be taken up.

Adjust the handwheels to set the wheelbases front and rear as required.

Replace the appropriate "rail inserts" for the new W/B's.

Readjust chain tension.

Place the loco on the test stand or roll it on if suitable rail segments are installed.

Install the "stop" stanchions.

Once it is in approximate position, clamp the loco between buffers or buffer

beams or via the hook or auto coupler, as required. The user should choose the most appropriate method for his loco. The two stanchions at each end provide very rigid basic support but I haven't specified how this is done. Some might prefer to use the hook, others, the buffers, and still others, the buffer beams.

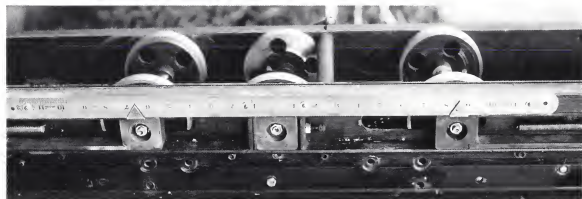
Conclusion

If building another machine I would:-

1. use commercially cut rollers made from 20mm plate or have them cold sawn from billets, whichever was available and cheaper. Either way I would not make them smaller than $4"$ (100mm) diameter unless I particularly wanted a w/b less than this for some special model such as a South American mountain type.
2. I would also use metric $\frac{5}{16}"$ shafts and bearings — either 15, 16 or 17mm — because they are cheaper by a considerable margin.
3. I would try to find a cheaper fine pitch screw alternative than high tensile NF screwed rod, and I must say I haven't yet succeeded. It can be lathe-cut of course but the best part of a metre is required.
4. Another option that builders can consider for a lighter smaller machine such as for $3\frac{5}{8}"$ gauge, is the use of $20 \times 20 \times 2.5$ mm hollow square section instead of 25×25 mm. This should only be considered for a small light model. The axle boxes would now be 20mm thick instead of 25mm. Similarly, they could be made of a smaller square section, but of course, then they would not be able to accommodate large bearings. The 6201 should still fit easily but the $\frac{5}{16}"$ race (RLS 5) could be a problem.

5. I would consider putting the middle axle one inch to the rear of physical centre of the machine, ie at 26 inches from front end, 24 inches from the back. It would depend on what sort of locomotive would be put on the stand.

To be continued ...



LHS view with cover removed

Steam Chest



with Dave Harper

Hi there steam fans, and welcome to another smorgasboard of steamery! There hasn't been a lot of feedback on the last issue yet, but with the Christmas holiday period that's probably not surprising.

Beginner's articles

There have been several replies to my query on beginner's articles on steam engines. All have been positive in that they want basic information on how a steam engine works. My problem now is how to approach the subject — my preference would be for a historical approach, to explain how the steam engine came to be the shape it is. This naturally would have to be much abbreviated, but with references to books for those interested in following up in more detail.

I don't feel qualified to write an article on how to build a simple steam engine. Anyway, there are numerous books available on that subject, the ones by Tubal Cain being among the best. However, if anyone among our readership feels that they would like to write on this important subject, I'm sure our good editor would like to hear from them!

Launch engine drawings popular

The set of drawings of the launch engine, from *Ripper's Machine Drawing and Design*, have proved very popular. This set of copies, kindly supplied by Jim Libby, gives full engineering drawings of a twin cylinder launch engine of 7" bore and stroke. There is also a mass of information on calculating the sizes, etc. of the parts, plus valve diagrams, etc. Running to about 40 A4 sheets

of information, this would be one good way to get an idea of how a steam engine works. And I can supply a set posted for the price of a book of 10 x 49c stamps! Send them via the editorial office of contact me by phone or email for my address.

Figures 1 and 2 in Steam Chest for issue No 105, Nov/Dec 2002, are of this engine.

Another launch engine

One of the interested customers for the *Ripper* launch engine was John Breedon from NSW. John is building his own steam launch and sent me some photos of it and the engine he's building to go in it. The launch is 16ft 8inches long and 5ft beam. The engine is based on the Bolton No 17 engine, with drawings supplied by Ernie Winter. However, John decided to modify it to be a four column engine and also modified the valve gear. **Photo 1** shows the hull — a classic carvel built launch. **Photos 2 and 3** show the engine partly built and the crankshaft with modified valve gear drive.

That looks really good, John, please send us some photos when she's complete!

More on mill engines

The request for information on why the Bundaberg mill engines have piston tail rods brought me information right from the horse's mouth! James Crane was a design draughtsman at Walkers of Maryborough for many years, and now retired, spends his spare time driving the *Mary Ann* historic steam loco in Maryborough. James was kind enough to write to me and I can do no better than quote from his letter:

'As a design draughtsman at Walkers, I

was responsible for the design of all the later engines. Reciprocating engines were universally used to drive sugar mills up to the early 1950s, when steam turbines began to replace them. It was generally assumed that reciprocators had had their day, but in 1960 CSR Ltd decided that they would install new engines in many of their mills.

Walkers Ltd. supplied many engines which were installed in the three NSW mills and also in their mills in Fiji. These were of the old-fashioned 'flat bed' design. Most were size 26" bore x 48" stroke.

The last two engines made by Walkers were those at Millaquin Mill supplied in 1964

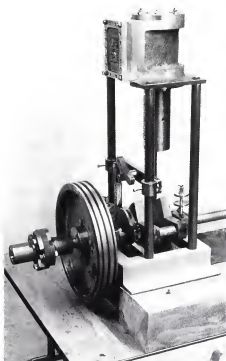


Photo 2

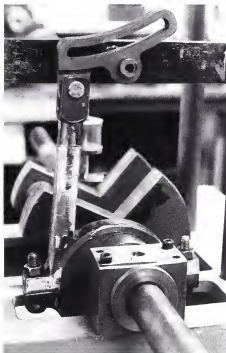


Photo 3

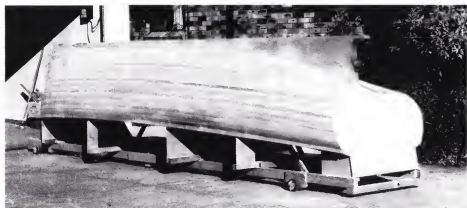


Photo 1



Photo 4

and 1965 (two of the handful of engines still operating). These are the biggest mill drive engines made by Walkers at 30" x 54". There is a record of 40" x 60" mine winding engines built very early in the 20th century.

Regarding the feature you mentioned — the extended piston rod with its slide — the purpose of this was indeed to support the weight of the heavy piston. Without this the wear on the bottom of the cylinder is appreciable.

This feature was not incorporated in all Walker engines. It depended on whether the customer was prepared to pay the extra cost or, in some cases, whether there was enough space to fit it in.

Another way of reducing the wear problem, which was sometimes employed was to increase the width of the piston at the bottom to provide a sort of foot to increase bearing area.

Since my retirement I have become a driver of Maryborough's favourite tourist attraction, the *Mary Ann* — I would certainly look forward to a visit by you.

Thank you very much for the information, James, and I'm working on paying a return visit to my friends at Maryborough! James also pointed out that the restored winding engine in the Gympie Gold Mine Museum was built by Walkers, and he had

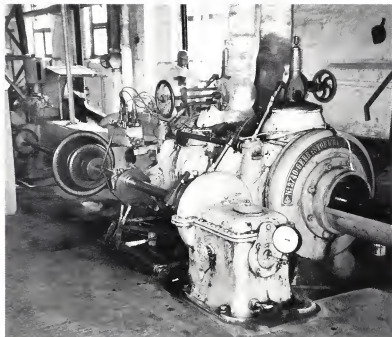


Photo 5

a hand in helping with the restoration.

Reminiscences to come

A recent welcome email was from Allen Sayt of NSW. Allen wrote to me with some reminiscences of his years spent as apprentice and fitter in the Marian Sugar Mill in Mackay. This is a neat coincidence,

as Marian Mill was one of the Mackay mills whose computer equipment I used to service some years ago! However, in light of all the other stuff I have this time, I'll leave Allen's stories for next time. Thanks anyway, Allen!

Yet more mill engines!

I also had an email from Ray Gardiner from NSW telling me that he and a friend had been visiting Indonesia mainly to look at the sugar mills there. There are apparently many mills there still using old steam machinery, with about 100 steam locos still in use hauling cane, and an estimated 400 big mill engines, vacuum pumps and generating sets still in use, as well as many small pumps.

Ray kindly sent some photos taken on his recent trip. As Indonesia was formerly the Dutch East Indies, most of the engines are of Dutch manufacture. They make an interesting contrast to the Walkers designed engines (see SC in Issue no 105)

Photos 4 and 5 show two engines in

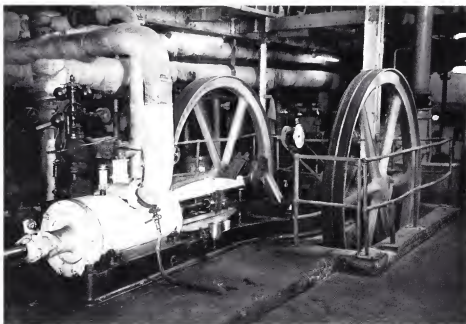


Photo 6

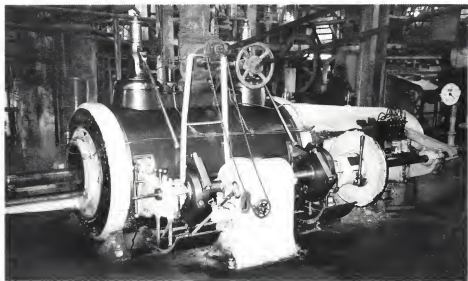


Photo 7

the Wringinanom Sugar Mill. Both were built by Gebr. Stork & Co. of Hengeld, Netherlands in 1928 and 1923 respectively. As will be seen, they both use poppet valves driven by a camshaft alongside the engine. At the crank end of the shaft is a circular housing which Ray tells me is a clutch to enable the engine to be reversed. At the cylinder end the large housing contains the hydraulic governor gear. Note also the piston tail rod with slide!

In photo 6 the piston rod is shown fulfilling another duty — in this case driving a

vacuum pump. This engine is in the Olean sugar mill, and was built by Fives Lille c.1890.

Also in the Olean mill the engine in photos 7 and 8 shows clearly the tail slide and the governor gear, also the clutch on the camshaft and what looks like a lubricator alongside the crosshead guide. This engine was built by Etablissement Fijenoord of Rotterdam and was built in 1926.

The little single cylinder engine in photo 9 is also in the Olean mill, and looks like it is driving a cane conveyor. Probably made by Stork of Hengeld.

In the letter accompanying the photos, Ray told me that he's been to Indonesia 6 times, mainly looking at steam locos used in the mills, but this year he also spent time photographing and videoing the mill engines and gear. Apparently out of about 200 mills once operating in Java, about 50 are still operating, many still using recip-

rocating steam engines.

There are several websites with loads of information on sugar mills and the processing of sugar. <http://www.messiaen.co.uk/steam/mills/javamil00.htm> is a great site, with a guide to how the mill works with many pictures, a guide to the engines, and many links. This site is run by Ray's friend and collaborator Rob Dickinson.

<http://dialspace.dial.pipex.com/steam/interat.htm> is an international steam page with a mass of information and links.

Thanks very much for all that information Ray! He and Rob plan to continue their research, but the recent Bali bombings have made things a bit uncertain. If anyone would like to assist them, I'd be happy to pass the message on.

Apparently there is a mass of information in the State Library of NSW in Sydney, written in Dutch! Ray is going through, and hopefully translating some of it. I may have some of this for you later.

Ray is also waiting on stuff from the Stork Museum in Holland who have about 25,000 glass plate negatives in their archives! Now he's planning a trip to Cuba to see the sugar mills there — good luck, Ray — surely one of the great steam enthusiasts!

Steam wagons

Going through the stuff that Tony Little sent me (More From North Queensland, SC last issue) I am amazed at how many different makes of steam wagons were built in the early 20th century. Mentioning this to old friend Dave Sampson, he promptly responding by checking in his extensive library, and informing me of the book *The Development of the English Steam Wagon* by R H Clark, published by Goose & Sons in 1965. This seems to be the definitive work on the subject, so could be worth searching out by anyone after more information.

One of the many brands I'd never heard of is shown in Fig 1, again from the copies Tony Little sent me. It is the Simpson and

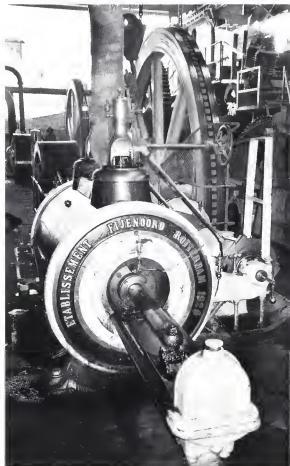


Photo 8

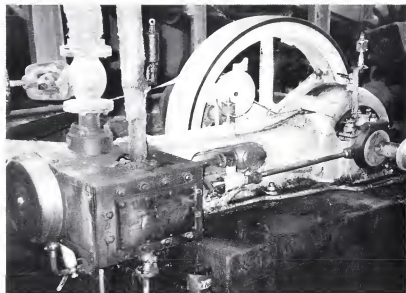


Photo 9

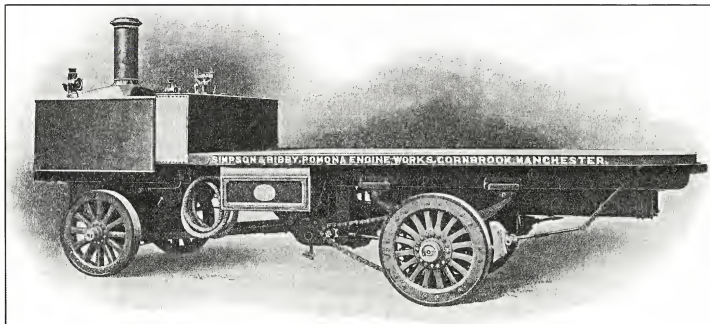


Figure 1

Bibby 7 ton steam lorry — about as basic a lorry as you could conceive. No creature comforts for the drivers in those days!

Hot air engines

As mentioned last issue, Edwyn Jones has produced a series of neat little hot air engines which are an ideal introduction to model engineering. They run on a few drops of methylated spirits, and come in kit form with all materials and detailed drawings and instructions via Minitech, one of our regular advertisers.

Photo 10 shows the V-H engine, with both vertical and horizontal cylinders. The vertical drive cylinder, with 13mm bore x 20mm stroke, is actually made from clear plastic so you can see the piston moving! The flywheel is 63mm dia and the engine will run at up to 1000 rpm. Good one, Edwyn.

Another simple engine

Also available from Minitech is a range of simple engine kits produced by Graeme Quail in New Zealand. A kit was sent to me to build and write up for an article for *AME*. However, I felt poorly qualified for the job, and another local friend, Peter Hall, volunteered to do the job. Just in time for me to include in this column, Peter called to say he'd finished the engine, and had written up his comments as well as taking photos for the article. Good on yer, Peter! The article will be in *AME* pretty soon, but to give you an idea, **photo 11** shows the completed model, one of Peter's excellent photos! Again contact Minitech for more information.

The turn of the wheel

Peter has also written an article on his experiences working in a railway wheel shop. Apparently the old lathes used for turning and truing railway wheels were quite remarkable. Unfortunately, Peter doesn't have any photos or drawings of the old

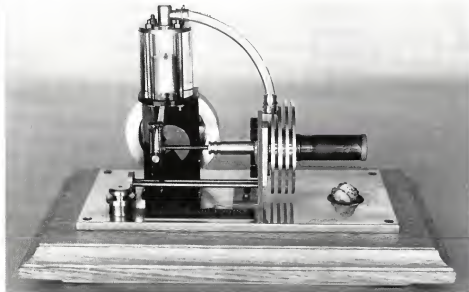


Photo 10

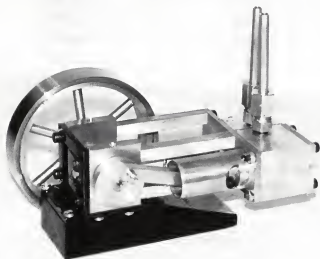


Photo 11

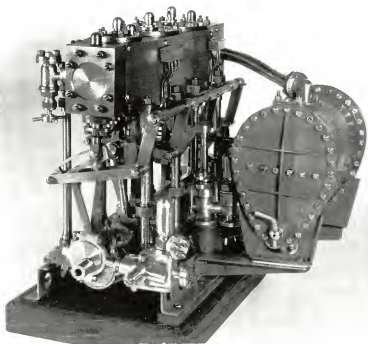


Photo 12

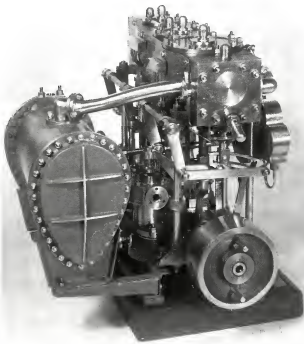


Photo 13

wheel lathes to illustrate his story. If there's anyone out there who has some pictures or engravings of old wheel lathes, and is prepared to loan them to us for a while, we'd love to hear from you! Please address any replies to me via email or the editorial office.

Big pictures of a beautiful model

Another email from NZ included some digital photos of a beautiful model triple expansion marine engine. To achieve decent reproduction, sender Max Kempson kindly sent them on a CD which went direct to David Proctor.

The model is one of several that were built by Max's father. The model is probably a Stuart design, but few other details are known. The pictures themselves are great, and **photos 12-14** show this magnificent model to good effect.

The other models Max inherited include a 1.5 inch scale Allchin Traction Engine and a 3 inch scale Wallis & Stevens Simplicity Road Roller. The latter was only 80% complete, so Max is finishing it off — a difficult thing to do to match the quality of his father's workmanship, apparently! Thanks for the thought, Max, and perhaps some pics of the TE and roller when finished would please our editor. (*They would ... Ed.*)

Max also mentions steering his father's steam launch *Sabrina*, one of the oldest known steam launches in the UK, back in the dark years of WWII, hidden away on the River Severn. He remembers 'as a ten-year-old, cruising at 10 knots or so at 7am with the mist still clinging to the water and the rest of the family having breakfast below. A long blast of the whistle and when we arrived at the next lock it would be open and ready to steam right in. Happy days long gone!'

Happy days indeed, and a fitting note to end this epistle. Until next time, happy steaming!

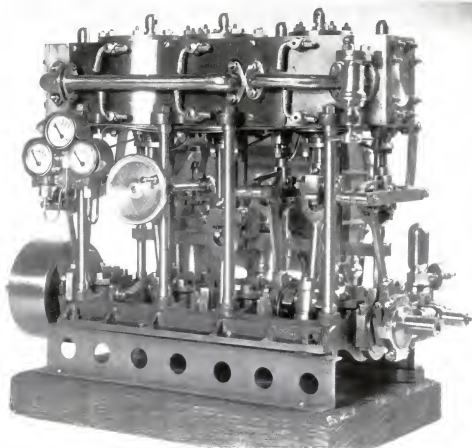


Photo 14

If you wish to contact Dave you can email him on:
sandave@bytesite.com.au or
write to him via the AME office

One Man's Models

Adrian Russell

Adrian Russell from Lake Cathie in NSW, as can be seen, is a fairly prolific builder of stationary engines. The following photographs show a good cross-section of his work. It is interesting to note that of the 10 different models shown most do not require castings and several can be scaled to whatever size the builder desires.

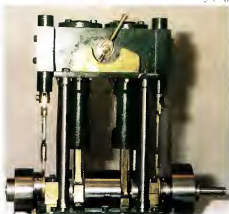
It is some time since we have featured a selection of one person's work in this column. I am sure there are many of you who have built various items which would be of interest to other readers. Perhaps, like Adrian, you would like to share them with us.



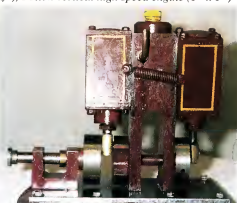
From left: Bolton single cyl. dbl. acting oscillator ($\frac{5}{8}$ " x 1"), scratch built donkey ($\frac{3}{8}$ x $\frac{3}{4}$ "), Bolton vertical high speed engine (1" x 1")



Hasbrouck 2-cylinder single acting engine with balanced piston valve (bore $\frac{5}{8}$ " stroke $\frac{1}{2}$ "). No castings required



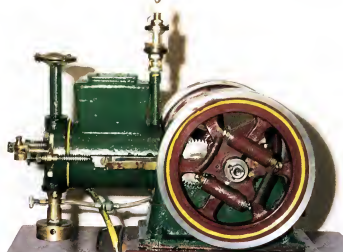
Hasbrouck 2-cylinder double acting reversing piston valve engine, bore and stroke $\frac{5}{8}$ ". No castings required



Hasbrouck 2-cylinder double acting oscillator, bore & stroke $\frac{3}{4}$ ", reversing by port exchange. No castings required, scale to suit



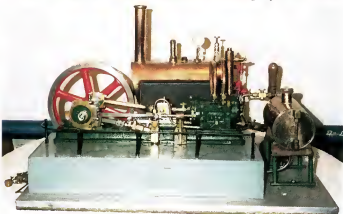
Rosebery Hit & Miss engine. Castings from E & J Winter and plans by R Paynter. Fuel tank is cast in the base, the 5-piece crankshaft was shrink assembled, no pins, welding, brazing or cleanup. The engine has run approx 40 hours with no problems at rallies.



Hit & Miss engine bore $1\frac{1}{4}$ " x stroke $1\frac{7}{8}$ ", castings by K Ainsworth



Hasbrouck 2-cylinder double acting oscillating valve mill type engine (bore 1" x $1\frac{1}{8}$ " stroke, no castings used)



Bolton Mill engine, double acting slide valve, $1\frac{1}{2}$ " bore x $2\frac{1}{4}$ " stroke

USA and Canada, Summer 2002

Story and photos by Dave Giles



Seen on the Burnaby Central Railway, #903, a steeple-cab electric has been rebuilt by owner Dan Morris. This loco is powered by two 24V DC 1/2 HP motors and a Curtis 1203A controller.



Heavy Mikado 2-8-2 owned by Max Turner on the Burnaby Central Railroad. The stylish building in the background is the Burnaby club's station building and club house.



Another shot of Max Turner's heavy Mikado, this time with the owner at the regulator. This powerful engine is stove oil fired and was built by Bill McCready in 1995.

Last August Lynne and I spent 3 weeks in the USA and Canada where we had a great time. Firstly we attended train meet on August 9 - 11 at the Burnaby Club in Vancouver. There were 30 visiting locos including many from other states, Mike Johns from the UK and Lynne and myself from New Zealand. We had a great time riding the *Rocky Mountaineer* luxury express through the Rocky Mountains from Vancouver to Calgary — Wow, it was fantastic! Two 3000 hp locos and 28 cars made up the train. The scenery was spectacular for the four days.

Lindsay McDonnell then drove us 650 km south to attend another invitation track meet at Tom Miller's private railroad in Portland, Oregon. The 22 acre site is manicured like a fine golf course. There is around 2 km of main line and 1 km of yards and the rail is Swiss steel profile. All the banks have ivy growing to hold them together. The 200 foot long trestle is a masterpiece in itself. It is fitted with a fire sprinkler system and fire hoses along its length. I was privileged to be offered Toms K36 Rio Grande loco (see cover) and rake of 20 scale cars to operate for the afternoon. Tom has built this loco and rolling stock to the highest standard in every way (It is equal to the superb standard of Bob Nash or John Wakefield's locos in Australia). As there is no satisfactory coal available for miniature locos in the USA Tom imports Aussie Char to run the K36 loco on.



The Carson Valley Express is based on an interurban freight motor type which operated in California in the 1920s and '30s. Dan Morris purchased this, one seen at Burnaby, and has recently fully rebuilt it



Al Von Rueden and his superb 7 1/2" gauge 2-8-2 Mikado at Burnaby. Al pioneered the type of propane burners being used in Canada and the USA over 30 years ago. Now 3 out of 4 locos are propane fired.



Howard Springer owns the #5 Mikado on the left. It weighs 1200 lbs and is fired with stove oil. On the right is the Northern 4-8-4 owned and operated by the Burnaby Central Railroad.



Doug Wilkinson built this superb 2-4-0 L'il Lima loco in 7 1/2" gauge. Finished in 1998 it is fitted with a propane burner, built to the design of Al Von Rueden from Seattle.



Tom Nicholson and his plantation loco #19 at Tom Miller's.



The plantation loco in 3 3/4" scale was built by Tom Nicholson of Portland, Oregon. Tom has also made a superb rake of scale rolling stock. The 12" boiler operates at 140 psi and is fired with stove oil



The 2-8-2 heavy Mikado wits on the trestle at Tom Miller's private railroad for owner, Don Deffley. This loco was built by Bernie Swinson in 1989 and is also propane fired.



K36 Rio Grande (left), also featured on this issue's cover, and Union Pacific Big Boy X4005 resting quietly in the workshop at Tom Miller's private railroad.



Tom Miller's station — Dennis Weaver's 2-cyl. Shay in the foreground



Dennis Weaver's 2-cyl. two-truck Shay and rolling stock. Tom Miller's wagon/rolling stock barn is in the background. The barn is heated in winter months to prevent rusting on the rolling stock.



The massive timber viaduct on Tom Miller's railroad is fitted with a sprinkler system and fire hoses to reduce the chance of fire. Tom Nicholson is crossing the dual track viaduct in this scene.



Tom Miller's machine shop — CNC mill and lathe on the left



#681, a 20 year old 7 1/2" gauge propane fired 4-6-2 was rebuilt by Trevor Heath in 2001 to look like a Chinese loco. Trevor is currently finishing a NSW AD60 class Garratt — watch this space!



Lindsay McDonnell (Burnaby), left and Mike Johns from Devon, UK service Lindsay's 7 1/2" gauge Britannia for another run on Tom Miller's railroad. This loco has a steel Briggs boiler with copper tubes, is propane fired and steams very well.

Tranz Rail DXR 8007 in 7 $\frac{1}{4}$ " Gauge

A new club loco for the Thames Small Gauge Railway

Article and digital images by Stephen G James

The New Zealand DX class of locomotive was first brought into service in 1971 for service on the main trunk line hauling the *Silver Star* express between Auckland and Wellington. Built by General Electric in the United States it was designed to run at 120kph. Initially 15 were delivered. In 1975 a further 34 were delivered to take over the heavier jobs on the railway. In their original form they were rated at 2749 hp. Up until the North Island main trunk was electrified this locomotive was the most powerful of the NZR fleet.

In 1993 a new face appeared on one of the DX locos and it was classified as the DXR class and was numbered 8007. The motor modifications increased the power to 3200hp (now the most powerful loco). The cab was completely rebuilt to a new design which has become the universal design for Tranz Rail as the cabs on other locos are replaced. Originally built for two man crews the new cab has been designed



The four prototype photos on this page show much travelled DXR 8007 in various locations on the Tranz Rail network as it earns its keep. Since the rebuild it has seen service extensively in both the North and South Islands.



for single engineer operation with all the controls in easy reach. The cabs are more roomy and have extra strengthening to avoid crushing in a roll over. Bull bars were also fitted.

The model

While we have kept to the general design of the DXR in building the club loco, we have taken some licence with the ventilation louvres on the long bonnet to protect the electronics from any rain. To make it more serviceable as a club loco some of the hand rails and fiddly bits have been omitted. The loco is approximately one eighth scale.

The loco is powered by 6 x 105 AH 12v batteries wired in a series/parallel configuration to provide 24 volts. All electrics are



Side view of bogie showing trunnion and use of stock self-centring conveyor belt tensioning bearings for the axle boxes



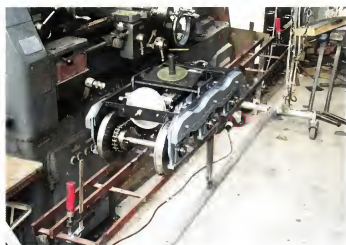
Side view of platform with bogies fitted



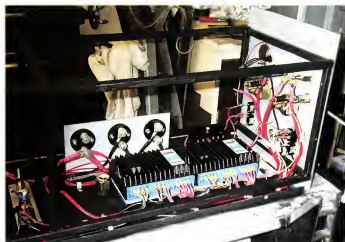
Bogie showing chain drives from centre axle driven by worm reduction box, side plates 8mm.

24v which is floating above the chassis. The bogies are Co-Co configuration driven on the centre axle through a worm drive from EMD 24v 40A 4 brush motors. The centre axle is connected to the outer axles by chain. The motors are controlled with Dynamic Controls DS100 electronic controllers running in tandem. Brakes are vacuum. A 24v vacuum pump evacuates a 3 litre tank and electrically controlled solenoid valves apply, hold or disengage the brakes — all wheels on the locomotive are braked. An elec-

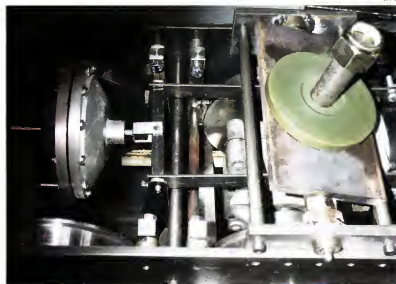
tronic sound of the diesel motor simulates the rise and fall of the turbo as the locomotive moves off. An electronic horn and flashing ditch lights are fitted. The locomotive is finished in the Tranz Rail colours and has the appropriate scaled Tranz Rail logo and numbers on the sides and front buffers. The scale model built by the author took approximately 6 months to complete at a material cost of \$10,000NZ.



A completed bogie ready to install. Note side pieces added for realism



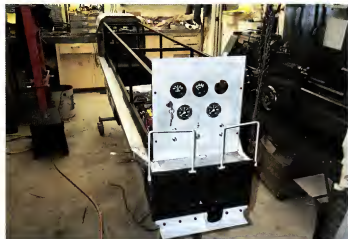
Background are isolating switches for motors and batteries. In front are two DS100 controllers and right, the wiring to control panel.



Vacuum cylinder and brakes trial fitted to a bogie. Note thrust washer of oil impregnated nylon on trunnion plate



Main platform formed from 2mm electro-galv steel. Battery well holds 4 of 6 batteries, bull bars have been fitted.



Control panel, not yet shaped to roof — 2 ammeters, 1 voltmeter, 2 vacuum gauges, 4 toggle switches, key switch, speedo and a socket for the hand controller



The cab under construction — ruler gives idea of size



With side doors fitted, the size becomes more apparent. All doors open but will not be used as regular servicing will be done from the top



DXR 8007 with Neil Whisker at the controls, awaiting departure — the rumble of the diesel and fresh paint set the scene



Vacuum pump evacuates tank for brake application. Note the heavy wires to the motor going through the platform base.



Two gas struts hold up the bonnet top for servicing the batteries



Bogies have been removed as body is readied for painting



DXR 8007 poses with its little sister DH 2839 at the Thames Small gauge railway's Grahamstown Station

Author Profile: Stephen James has been the president of the Thames Small Gauge Railway Society since its inception 9 years ago. The Club DXR loco is the 12th locomotive built by Steve. Of the 12 locos, 4 have been steam, 1 petrol/hydraulic and 7 electric.

Make a Pillar Tool or Tapping Stand

Text and digital images by Brian Smith

Several times I have heard people say "I need a Pillar Tool so that I can tap square." Or perhaps "I wish I could get some castings to make a tapping stand." Or the more enterprising "I am looking for suitable bits to make up a Pillar Tool tapping aid."

Well if you are one of those you may not need to look far. Quite possibly you have a partially made Pillar Tool right on your bench. That's right, in your own workshop. Have a good look at your bench drill. Ignore the head with its spindle, handles, pulleys and motor. What is left is most likely a base, column and something on the column supporting a table, the major ingredients of a Pillar Tool or tapping stand if you prefer. Major because they are the stumbling blocks for all of those people "looking for castings" or "looking for bits". Just about any model engineer can make up the necessary remaining 'bits' to temporarily convert most small bench drills to a Pillar Tool as a tapping aid.

Most likely your bench drill will have either a rotatable table or a simple inclinable table. If the former, removing the table gives you a clearer view of the workpiece. If the latter, it will almost certainly have a hole through the middle. Most of the small low cost bench drills on the market over the past 25 years have a cast central hole about 18 to 19mm diameter. The diameter doesn't really matter nor the fact that it is cast. We only need a hole which is big enough. You will have to decide what is big enough for you. What you now need to make is a flanged guide bush to replace your rotary table or alternatively to place in or over the table's hole and a spindle which will hold a drill chuck one end and a T bar the other — your new tap wrench.

Photo 1 shows the tapping attachment in place on a drilling machine. The table has been swung aside for the wrench to clear the drill chuck. The example shown was made for this article in just under 1 hour from bits and pieces on hand. It was actually made to suit a larger bench drill hence the overlong tap wrench spindle. However the machine pictured was not bolted down and is easier to carry outside into good light. The piece of round in the chuck is propping up the chuck and spindle clear of the machine base for the photo.

Before making the two simple parts mentioned above you will need to find a suitable keyed drill chuck. Size will depend on the size of taps you envisage using. Drill chucks are usually available with 3 basic types of mounting on their drive spindle.

1. Taper mount (a short stub taper).
2. A threaded mount (the chuck screws onto a threaded spindle)
3. Some indefinable construction which totally defies your efforts to dismantle it into two separate parts — chuck and spindle.

It is a matter of your choice which of these you are prepared to adapt. In use type '1' is the best because the chuck will most likely not detach from the spindle when reversing a tap. You will, however, be faced with turning a matching taper on the tap wrench spindle. Type '2' is probably the easiest for most to adapt depending upon the thread used in the chuck. Some small hand drills, cordless drills or portable electric drills do use a $\frac{3}{8}$ " 24TPI UNF thread. That is about the best of type 2 as the tap wrench spindle does not need to be over $\frac{3}{8}$ " diameter for most model engineer applications. You

may find a type 2 to your liking, the spindle of which could be fitted (pressed, clamped or glued) into the tap wrench spindle — your choice as to what you use. Type 3 can possibly be mounted in the same manner. You have 2 final constructional choices influencing all other dimensions — dimensions of the tap wrench spindle and T bar.

The accompanying photographs hopefully give you a clearer understanding than words can. Whilst the basic concept is the same, builders face their own individual preferences with different dimensions demanded by their intended workpieces and the drilling machine they intend using. However I include a few comments to guide would be builders.

The diameter of the spindle will determine the diameter of the bore of the guide bush. The space available for you to operate the tool without scoring your hand on the drilling machine's chuck or spindle will determine the length of the tap wrench. The guide bush dimensions are easily determined. The tap wrench spindle needs to be a sliding fit in the guide bush to ensure taps are held square to the machine base without any lateral movement (that's sideways) to break them. If you are using a drilling machine with a rotary table, the guide bush can be made with a smaller flange but the body of the bush needs to be a good fit in the drilling machine knee so that it can be clamped in place as the machine's table was. **Photo 2** shows the complete tapping attachment assembled. The guide bush can be mounted either way up. It can be clamped to the machine table or secured by 2 screws which can just be seen in **Photo 1**. The chuck came from a cordless drill. The original chuck mounting spindle is included as an example. (The thread appears left handed which is a trick of light. Cameras may never lie but scanners obviously do!) **Photo 3** shows the individual parts of the attachment as 'used' in **Photo 1**.

I make no claim as to the originality of this concept. No doubt many more have utilised, and even published this basic scheme than the total words in this article. However I do not recall any published article or of hearing any discussion utilising a drilling machine with the table configuration illustrated.



Photo 2



Photo 3



Photo 1

Canberra Invitation Run in Pictures

by Col Fuller



Ivan Evans from Yanco brings his beautifully finished Royal Scot to most of the Canberra Invitation Runs



Green Hornet, the Blowfly which belongs to Canberra SMEE President Peter Coleman and son Greg is a regular sight at the track



The 5" gauge GNR Stirling Single is an ever popular design



John Nicolson always enjoys a drive of Ian Smith's Bunyip. Shortly before this shot was taken Bunyip was hauling 12 large wagons



Blue Gum came down from Luddenham (SSME) for the weekend.



Les Mouat is raising steam in his "Black" Five. You don't think it looks very black? You must be colour blind!



Local member Kel Broughton and his big diesel are regular passenger haulers on CSME's Kingston Miniature Railway

Sparks 'n' Arcs



Batteries

Frequently Asked Questions About Choosing and Caring for Batteries on Miniature Locomotives

by Dave Giles

Q. How do I decide on the correct size battery for my battery powered locomotive?

A. Most DC motors that are suitable for powering miniature locomotives operate on 24 volts and have permanent field magnets. Let's assume that the motors are 24 volt. This requires two 12 volt batteries in series to make up a 24 volt system. Four six volt batteries in series can also be used.

A typical battery electric locomotive with 2 x 600Watt DC motors ($\frac{3}{4}$ HP ea.) geared to a maximum speed of 12 km/hour will haul 10 adults on grades of 1.5% — 2% with ease.

The total current draw from the batteries on a typical journey will be about 20 amps on the level sections and about 60 amps on the gradients. Most miniature railway tracks are a loop so the uphill section can not be more than 50% of the journey. On the downhill section there is virtually no power being consumed and in some cases a very small amount of power is returned to the batteries from the dynamic braking effect of making the motors into generators. While passengers are being loaded the loco is usually stopped for about the same time as the trip takes so the average current draw per hour is only about $\frac{1}{3}$ of the maximum amps being consumed on the up-grade section of the trip. The average current usage in this example would equate to 20 amps. If 80 amp/hour batteries in series are powering the locomotive you could expect to run the locomotive for 4 hours before the power would start to drop off, i.e. total battery voltage down to 23 volts. Eg. 80 amp/hour battery divided by 20 amps = 4 hr expected running time. If 100 amp/hour batteries were being used, 5 hours running time could be expected. The general rule with batteries is 'bigger is always best' if they will fit in the available space.

Q. What voltage is a fully charged battery?

A. For a 24 volt system this is 25.6 - 25.8 volts when the batteries are not connected to the battery charger.

Q. How far can I draw the battery voltage down before I start to permanently damage the cells?

A. 23 volts is considered the minimum voltage that the batteries should be drawn down to if permanent damage to the cells is to be avoided.

Q. Can a battery be left in a discharged condition for a few days without damaging it?

A. No, after your run for the day put your batteries on charge as soon as you can. Chemical changes take place when batteries are left in a discharged state for any length of time. This may mean that the plates start to sulphate and they will never fully return to a 'fully charged' state.

Q. Are sealed GELL CELLS better than WET CELLS? (With removable top up caps)

A. In general the sealed type of GELL CELLS do not last as long on cyclic use as the wet cells that you can top up with electrolyte.

The GELL CELLS do have certain safety advantages in that they do not vent explosive hydrogen fumes when being charged or spill acid in the event of a roll over.

Q. Are TRACTION or DEEP CYCLE BATTERIES of different construction than the sealed GELL CELL type of battery.

A. Yes, traction batteries have thicker plates, the plates are fastened in the case more securely to cope with vibration. The battery case is also deeper which allows more space at the bottom of each cell for debris to collect before it starts to short across the bottom of the positive and negative plates causing the cell to fail.

Q. Are there any viable alternatives to LEAD ACID type batteries?

A. Yes there are several different types but the cost of the exotic types is out of all

proportion to the cost and performance of a conventional Lead Acid battery.

The Lead acid battery is still the only viable choice at present.

Q. What is the best type of battery charger, single-stage or two-stage?

A. The single-stage battery charger gives a compromise charge. If left on for too long after the batteries reach their fully charged state the cells can overheat and boil the electrolyte, which then evaporates.

The single-stage charger is reasonably cheap to purchase and it is best suited to supervised use, i.e. It must be turned off as soon as the battery comes up to full float voltage.

The two-stage charger is easily the best for batteries that are on intermittent use. This charger starts charging on a boost voltage of 29 - 30 volts for two or three hours and gets things moving inside the cells. It then cuts off and comes in on a much lower float maintenance charge voltage level of 27.2 - 27.4 volts. This type of charger can be left turned on without overcharging or heating the batteries and shortening their life. It is the type recommended for the sealed types of GELL CELL batteries as it does not cause the electrolyte to 'gas'. It costs considerably more than the single stage charger but the sealed batteries have a much longer useful life.

Q. How do I know what amperage battery charger to use for my 80 amp/hour batteries?

A. The battery manufacturers recommend that to obtain the longest life from your batteries the charger should be sized to give a full charge over a period of 10 - 12 hours.

The maximum charging current amps that a battery can accept is its rated Amp/hours divided by 4.

In this example the maximum charge rate that a 80 amp/hour battery could accept is 20 amps.

This is not recommended as the high charge rate severely overheats the plates and they buckle and start to disintegrate. The battery life will be very short if it is charged at this high rate.

If your loco has 80 amp/hour batteries, an 8 amp charger will take 10 hours to fully recharge them, i.e. 8 amp x 10 hr = 80 amp hour. An 8 amp charger is perfect for 80/100 amp/hour batteries.

Q. Can parallel / series / parallel stacks of batteries be charged together or does each bank have to be charged separately?

A. The industry opinion is that it is not satisfactory to charge strings of series / parallel batteries with a common charger. The variation in resistance between batteries in parallel causes uneven current flows. If this lash up has to be used, it is better to charge the series strings separately.

Q. Does the Amp/Hour capacity of a

battery reduce with short heavy usage and then long periods of inactivity?

- A. As long as the batteries are stored fully charged they last fairly well. This however needs to be taken in context that the life of a battery is never more than 4 years even if it is properly charged and cared for. The internal plates 'sulphate' over time and they eventually fail at around 3 - 4 years.

If a single stage charger is used the batteries should be put on charge for two hours every month to keep them fully charged. If a two-stage charger is used they can be left on float charge.

- Q. How long do you expect batteries last in a miniature locomotive used one day per month?

- A. Three to four years is the usual life of a battery however some only last one year if they are discharged and charged every day. In our business of manufacturing and servicing battery powered vehicles we have had the odd case of premature failure with all brands of battery but in general they should last three - four years in miniature locomotive usage.

Makers of the Sealed types claim a cycle life of 300 - 350 cycles, i.e. full - flat - recharged.

The makers of the Trojan Deep Cycle wet batteries that are often used in Golf Karts claim a typical battery life of 600 - 700 cycles. These cycle/ life predictions are assuming the battery is used and charged on a daily basis.

To obtain the best life from a battery it must never be discharged below 11.5 volts on a 12 Volt system, or never discharged below 23 volts on a 24 V system.

The information on batteries and chargers has been gained from practical experience gained from many years of building more than 600 battery electric vehicles ranging from single seat Mobility scooters weighing 100 kg up to 48 seat people movers weighing up to 5000 kg. Many variations of battery electric railway locomotives and two race winning solar/ battery powered racing cars have also been designed and manufactured by the author over the past 20 years. Take a look at www.ikoneng.com

In the next issue we will look at Battery Circuits and Motor Winding

Oil Spills

Here is my proven method of cleaning up an oil spill in my workshop. Mop up surplus with an old rag, then cover up the oil spill with a generous layer of neat cement and leave overnight. Sweep up the cement and hey presto! a nice clean floor.

— Adrian Russell

Australian Model Engineering

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20th Anniversary Celebrations at Forrest Park Railway, Bunbury

by Dick Langford

The weekend of 16 and 17 November 2002 saw plenty of steam activity at Bunbury in Western Australia as the South West Model Engineering Society celebrated its 20th Anniversary with a weekend of steam at its Forrest Park Railway.

Twenty years ago the society was established by three local model engineers; the late Jack Thompson, the late Norm McDougal and its current President, Jeff Clifton. Negotiations with the City of Bunbury for a suitable track site resulted in the development of an extensive ground level 5" and 7 1/4" gauge track in Forrest Park. The track is enhanced with a large workshop and clubroom building and an extensive roundhouse for locomotive storage.

A dozen or so Perth model engineers and their partners made the 200 kilometre trip south to Bunbury to help make this meeting worthy of a 20th Anniversary. Both of the Perth societies, the Castledare Miniature Railway and the Northern Districts Model Engineering Society, were represented. A contingent of friends from the Katanning Miniature Railway also drove across to help with the celebrations.

Activities commenced on Saturday morning with 5" and 7 1/4" gauge locomotives soon operating on the track. Ernie Redford (NDMES) was among the early starters. He is seen in **photo 1** driving the NDMES club locomotive, a 5" gauge *Bloutfly* started by James Giddens and finished by Phil Gibbons and Steve Reeves. Ernie converted this loco to gas firing recently, using burners he

made to a design published on the web by the Golden Gate Live Steamers of San Francisco. These burners perform very well and are much quieter than the more common, commercially available, Seivert burners. The gas firing system has been fully certified by a registered gas inspector. With its slip eccentric valve gear, this engine needs a kick start, but once on the move, performs very well!

Mike Rodgers' Sweet Pea, *George*, also kept the 5" gauge rails warm over the weekend. *George* is a nice little engine to drive and shoulders around the track like all short wheelbase 0-4-0's. Mike is a member of both NDMES and the Bunbury Society and this reliable little locomotive performs regularly at both tracks.

A neat blue Super Simplex, built by SWMES member, Ken Dyne, completed the trio of 5" gauge engines in operation during the weekend. This engine closely follows Martin Evans' published design and, like most Simplexes, runs very well. Ken was certainly pleased with its performance over the weekend.

Some fine 7 1/4" gauge locomotives ran during the weekend. *Southern Cross*, a 2-6-2 built in the early 1980's by Albert Woods is based on a WAGR P class locomotive. In **Photo 2** it is being driven by Colin Pusey who is the driving force behind the wonderful collection of stationary steam engines that now operate regu-



Photo 3 Photo: Noeline Langford



Photo 1



Photo 2



Photo 4



Photo 5

larly at the old timber industry maintenance workshops at Yarloop, about 55 kilometres north of Bunbury, on the South West Highway to Perth.

Jeanette Sherman, from Castledare, found Jeff Clifton's $7\frac{1}{4}$ " gauge engine, an un-named 2-6-2 rather magnetic and was seen driving it for many hours. She is at her happiest when she is astride a steam engine, as in **Photo 3**. Jeanette is also pretty capable with an oil can as shown in **Photo 4**, where she is oiling the 2-6-2's motion. This locomotive was the first to operate at the Forrest Park Railway and is still a major performer on the club's monthly public running days.

Two visiting $7\frac{1}{4}$ " engines from Castledare are shown in **photo 5**. *Beechbina*, in yellow livery, is based on Silverton Tramway 2-8-2 locomotive No.22. These locomotives are almost identical to the WAGR W class, both types being built at the same time by Beyer Peacock. She belongs to Rod Pitt and is being driven by Craig Soulis. *Cambridge*, a beautiful 4-6-2, is the other locomotive in this photo. Her builder was the late Ernie Nelson and she is now owned by Allan Pitt, Rod's brother. Crossing manager, Craig Belcher, appears to be determining which of these two locomotives will head off first. The track arrangement at this point, just east of the station, is complex and busy, as shown in **photos 1 and 5**. While Craig was resolving this crossing issue, his parents, Sue and Ken, were very busy with other hot objects as they supervised the barbecue action at lunch time in **photo 6**. Ken is secretary at Castledare and, like all good secretaries, is a dab hand at all manner of things, including fixing the occasional snag!

The railway in Forrest Park winds among some magnificent Karri trees. **Photo 7** shows *Beechbina* in the forest while **photo 8** shows *Cambridge* with more trees and Forrest Park station in the background. Forrest Park Station was busy throughout the public running period on Sunday afternoon. This station building has a long history; it was originally the WAGR station building at Capel, about 30 kilometres south of Bunbury.



Photo 6

Photo: Noelene Langford



Photo 7



Photo 8

As the sun set on Saturday night after a beautiful warm Western Australian spring day, Jeff Clifton treated us to another barbecue and entertained us with a fascinating video of the Havelock North Live Steamers and Associates magnificent track. This video was taken in January 1994, during the New Zealand national convention, so there was plenty of railway action on this magnificent track to attract our attention.

Sunday was another beautiful day and again by mid morning the track was in use. Sunday was the Club's regular public running day so most of the larger engines were kept busy hauling passengers. The public passengers enjoyed riding behind the visiting engines. As the public running session closed, it was time to recover from all this tiring activity, as Dion Jackson shows us in **photo 9**, and then to pack up and return home after a very pleasant and relaxing weekend.

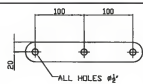


Photo 9

The LB10 Elbow Gate — part 2

by David Mottram

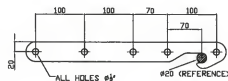
Drawings by the author, photos by David Proctor



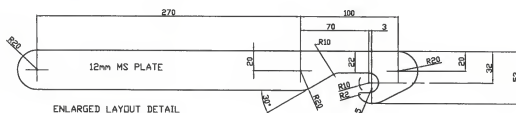
SPACERS (1mm MS SHEET)



WASHERS (1mm MS SHEET)



DRILLING DATA



ENLARGED LAYOUT DETAIL

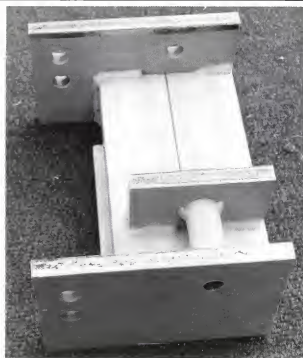
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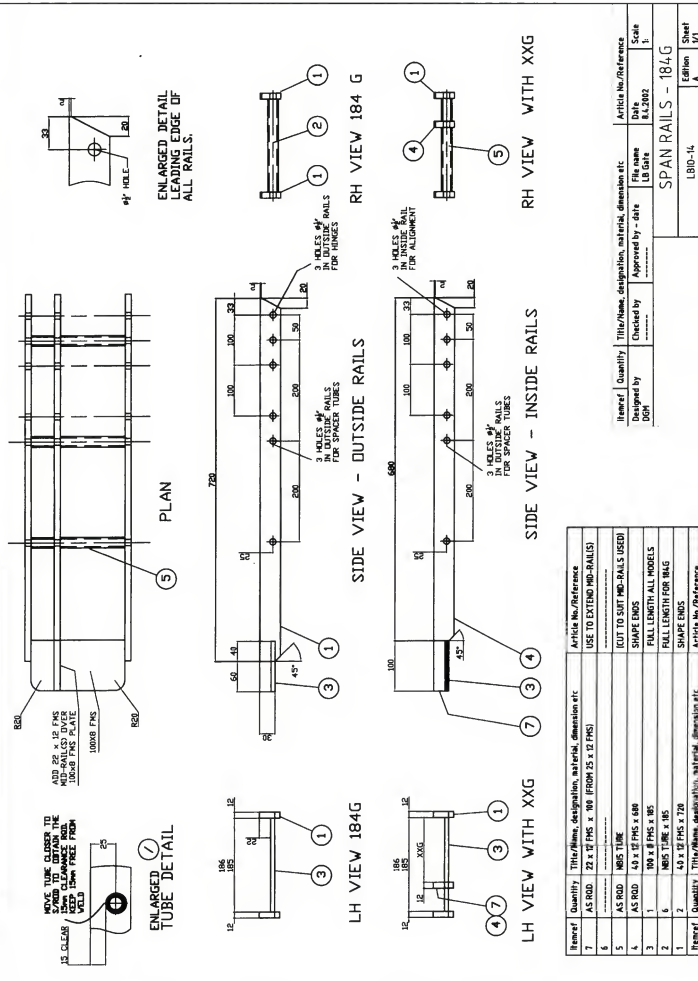


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3	2	WASHERS (from MS SHEET)	FIT BETWEEN HINGE & PIVOT
3	2	SPACERS (from MS SHEET)	FIT BETWEEN HINGE & SPACER
3	2	1/2" MS PLATE	PROFILE CUT or FABRICATED
Item#	Quantity	Title/Name, designation, material, dimension etc.	Article No./Reference
Designed by DGM	Checked by -----	Approved by - date -----	File name LR Gate
			Date 8.2.2002
			Scale

LONG HINGE

LBIO-17	<div style="display: flex; justify-content: space-between;"> Edition Sheet </div>
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8	AS ROD	22 x 12 FMS x 90 (FROM 25 x 12 FMS)	USE TO EXTEND MID-RAILS)	
5	AS ROD	MBS TUBE	(CUT TO SUIT MID-RAILS USED)	
4	AS ROD	40 x 12 FMS x 680	SHAPE ENDS	
3	1	100 x 8 FMS x 185	FILL LENGTH ALL MODELS	
2	6	MBS TUBE x 185	FILL LENGTH FOR 184G	
1	2	40 x 12 FMS x 720	SHAPE ENDS	
Itemref	Quantity	Title/Name	designation, material, dimension etc	Article No./Reference

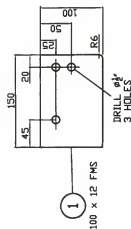
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5	AS ROD	MBS TUBE	(CUT TO SUIT MID-RAILS USED)	
4	AS ROD	40 x 12 FMS x 680	SHAPE ENDS	
3	1	100 x 8 FMS x 185	FILL LENGTH ALL MODELS	
2	6	MBS TUBE x 185	FILL LENGTH FOR 184G	
1	2	40 x 12 FMS x 720	SHAPE ENDS	
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4	AS ROD	40 x 12 FMS x 680	LB Gate	1:
3	1	100 x 8 FMS x 185	LB Gate	1:
2	6	MBS TUBE x 185	LB Gate	1:
1	2	40 x 12 FMS x 720	LB Gate	1:
Itemref	Quantity	Title/Name	designation, material, dimension etc	Article No./Reference

SPAN RAILS - 184G

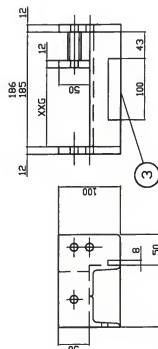
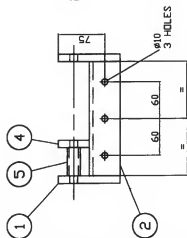
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Edition A

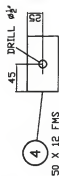
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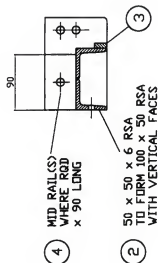
DIMENSIONS OF SIDE PLATES



DIMENSIONS OF MID RAIL



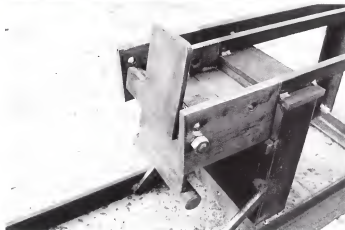
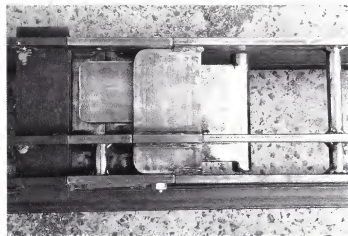
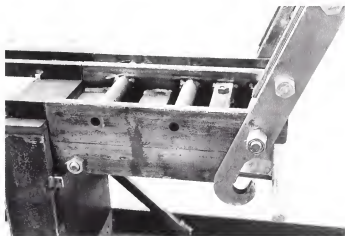
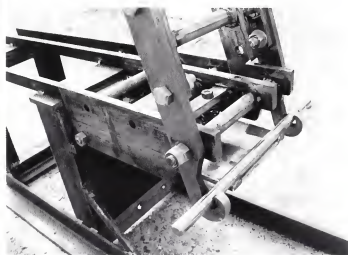
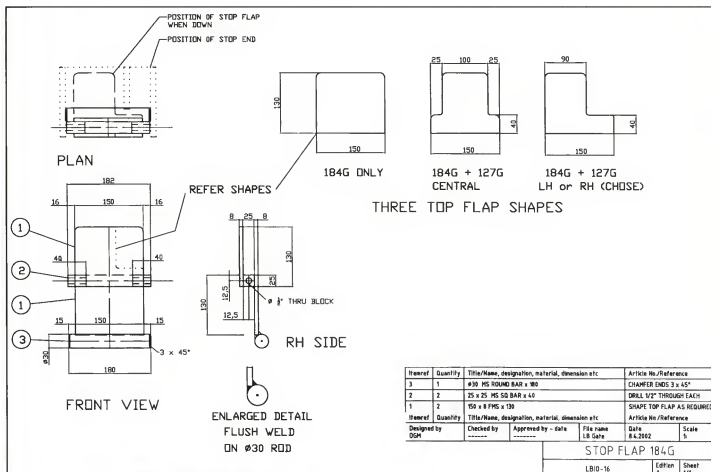
SECTION ON MID RAIL(S)



Item#ref	Quantity	Title/Name, designation, material, dimension etc	Article No./Reference
1 OR 2	5	NBS - AS RRD (PACING ENDS)	DO NOT USE IN FLAP POSITION
AS RRD	50 x 10 PMS # 90	IND-RALIS	POSITION TO SUIT HAND GAUGE
3	1	20 x 8 PMS x 100	MAY USE 80 ± 50 RESC - CITY 1
2	2	50 x 50 x 6 PMS x 185	MAY USE 80 ± 50 RESC - CITY 1
1	1	100 x 50 PMS x 650	MAY USE 80 ± 50 RESC - CITY 1
Deciphered by DDGH	Checked by _____ Approved by _____ Date _____	Title/Name, designation, material, dimension etc	Article No./Reference
		File name LB Gate	Date 8.4.2002 Scale 1

STOP END 184G

LB10-15	Edition A	Sheet 1/1
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To be continued ...

Club Roundup

Compiled by David Proctor

Adelaide, SA

We have achieved Government registration as an Amusement Structure. Although this impacts on members in different ways, it nevertheless necessitates a change in the way in which we are now required to operate our public days. We are no longer able to make up the rules to suit ourselves; they are laid down in the SA Regs as well as in the required risk assessments. As a hobby that has been used to determining its own path by a simple show of hands in a meeting, that show of hands now in ignorance and misguided advice, can well lead to a breach of the Regulation and indeed jeopardise the Registration. This is only impacting on a total of 14 days a year; you still have 351 to play trains. There is to be a review of the legislation early in the New Year.

Adelaide Miniature Steam Railway Society
Location: 370 Regency Road, Prospect
Public Running: 4th Sunday

Bendigo, Vic

Bendigo SME have not had an entry in Club Roundup for some time. To bring everyone up to date, the club meets on the 4th Monday of the month at 7:30pm in the Don McKinnon Pavilion at the Prince of Wales Showgrounds. The club has been exploring possible sites for a multi-gauge running track, including above ground 3 1/2". We have picked out a quite suitable site of approx. 8 acres, 300 metres north of Lake Weeroona which could also have a large water feature for electric, steam and wind-powered model boats. We are also preparing for our biennial Model Engineering Exhibition which will be held on 5-6 July as usual at Kangaroo Flat Leisure Centre.

Bendigo Society of Model Engineers Inc
Location: Under consideration
Public Running: None

Blenheim, NZ

Both tracks very busy on both days of our Two Day Weekender on Nov 30 - Dec 1 as well as Sunday evening with four operating on the ground level and four on the raised tracks. Visitors included Peter George from New Plymouth with his very nice 2" gauge NZR J which ran as well as it looked. Gavin Hargreaves and son with No 44 Forney tank type clocked up a good number of kms and Jack Dyas also from Nelson had

a brief spell with his interesting diesel. The Christchurch contingent saw Jock Millar with his NZR Y (*Simplex*) who obviously had a good time with all the oil on his face, Ross Fielden at last found a ground level track to run on by the look on his face. Graham McElroy brought his 5" g. NZR Fa — a nice size for the raised track. The indefatigable Stan Vernon from the deep south complemented his attendance and clocked a number of kms, whistling as usual. Ken McIntyre ran both days and Saturday evening, flawlessly of course. The small collection of work in progress in the club rooms should have given some indication of things to come and it also impressed several members of the public who took the trouble to view the display.

The public attendance on Saturday was reasonable but Sunday was a disappointment, but as it turned out, it gave everyone a chance to talk with our visitors which is most important and this becomes very difficult with a small membership. We had a good turnout with visitors from Warkworth, New Plymouth, Pictor, Nelson, Christchurch and Dunedin.

Marlborough Associated Modellers Society
Location: Brayshaw Park, Blenheim
Public Running: 1st Sunday

Box Hill, Vic

What a magnificent day for our All Comers' Day. The sun was shining, with the temperature well in the twenties. The only clouds in the sky were little dabs of cotton wool. There was a line up of trucks and cars all trying to off-load their locomotives, and great activity in the steaming bay with a variety of engines, from some very small 5" gauge to the great 7 1/4" diesel engines with noises that drowned out normal speech. We had 26 locomotives at the track.

The much needed pathways from the Clubroom to the containers will be done as soon as the point lever controlling the carriage shed is located, hopefully soon. As well as the path, a level crossing will be constructed in line with the containers for easier access for mowers and wheelbarrows.

We are now having public running on the second and fourth Sunday of every month, except December.

Box Hill Miniature Steam Railway Society
Location: cnr Elgar & Belmore Sts, Box Hill
Public Running: 2nd and 4th Sundays

Burnaby, BC Canada

It was our second busiest year ever, with 31,078 passengers carried and no serious accidents.

Our meetings are now more entertaining than business, with a whole series of speakers in addition to our regular auction, model contest and Christmas party. Our library is now more accessible. More and more members are bringing out their families to our events, and in general things are more fun, as a club should be.

Our Halloween run was a great success. 730 persons/ghouls came out to ride the trains. A crowd of members turned out to man the trains, co-ordinate the platform, sell tickets and give out hot chocolate and donated cookies afterwards. Yet more people carved pumpkins, painted faces on ghost heads (the last thing made by Danny Wilhelm before his final illness) prepared "spiderwebs", and set everything up before the run started. Persons in costume wandered about, scaring or delighting the children. Chris Sturges of the special effects company Capricorn Multitech provided yet more atmosphere with his smoke machines and lighting. All this effort wouldn't be justified by the financial return, but it was sure justified by the fun we had!

British Columbia Soc. of Model Engineers
Location: Rainbow Creek Station, 120 Nih Willingdon Ave, Burnaby, BC.
Public Running: Saturday, Sunday & public holidays, Easter to Thanksgiving

Christchurch, NZ

Our exhibits at the Pioneer Stadium Model Train Show were once again very successful and attracted much attention from the general public.

Although we don't have a lease and licence yet for the Halswell Domain site, the resource consent is now complete and reserve consent is progressing well, albeit at council speed. The 112 sq metre engine shed plans are now complete and ready for a building permit so a start can be made as soon as the lease is to hand.

Canterbury Society of Model & Experimental Engineers
Location: 26 Andrews Cres, Christchurch
Public Running: 1st & 3rd Sundays
www.csmee.org.nz

Eltham, Vic

Preparatory excavation and conduit works for the new Diamond Valley 'B' Box Relay room are complete and building works should commence shortly. The completion of this stage of the project will then move the focus to the Signal Box proper which will be located on the other side of the main line.

Two Gantries were erected at Pine Creek during December and now await the fitting of permanent signals. This project will further reduce the workload on the Signal Train each running day. Pine Creek has also gained the long awaited third road which

has become the mainline.

Activity on the mainline re-railing project has moved on apace recently following the establishment of a more reliable supply of plastic sleepers. Fifty-two panels of 6kg rail have now been completed, (only 293 to go). Six panels are currently awaiting the end of Wednesday school holiday running to finish the relaying of the Avenue of Honour. Our first set of points using the new 6kg rail has been completed and similarly awaits installation. This is a double curved replacement set for the down end of roads 1 and 1A at Diamond Valley Station. Some changes to the construction pattern were made during the building of this set to take full advantage of the new rail and plastic sleepers. The sorting of the 14lb rail stack continues with surplus rail being offered for sale.

Rolling Stock activity is centred on a number of projects including the major re-building of the old works loco, D1300. This was the first loco built by members and is to receive a new engine and a major refit of the bogies and brakes. The fleet overhaul and repainting of the NBH cars is moving closer to completion with another 2 units almost ready for out-shopping. (Only 4 to go.) The RPC Guard's car is being re-contoured to provide a greater likeness to the Norman car and the entire set is to be repainted in blue and gold. Work is continuing on the construction of two new BC passenger cars with bogies currently being completed and steel arranged for the frames.

Diamond Valley Railway Inc

Location: Eltham Lower Park, Main Road, Eltham

Public Running: Every Sun & most pub hols
<http://www.dvr.com.au>

Galston, NSW

The July running day saw the return to service of the club 44214 diesel outline loco. This loco was originally built by Arthur Jones to assist in the heavy running program undertaken to purchase the Galston site. This work load on the loco finally required a major overhaul that turned into a total rebuild, which was undertaken by Warren Williams. The loco is now in Freight Rail blue.

The site works programme has seen the completion of the paving of the public area between the station and Cutcher's Crossing bridge. It has improved safety and stopped the erosion that was depositing silt onto the track. The conversion of the old engine shed into a library is progressing. The mesh wall panels have been removed, a new concrete floor poured and the framework commenced to connect with Martin's Place.

The steel track for the loco unloader has been extended and concrete poured in the recently excavated area. A brick wall has been erected to retain banks around it. The unloader itself has been turned through 180°, a move that will eventually allow better access to all of the elevated steaming bay tracks which are now in the process of being re-aligned. A closed circuit television

system to display the area of Cutcher's Crossing in the signal box has now been installed. Two p.a. loud speakers were installed on the same post as the CCTV camera and another four speakers on two more poles around the area. All wiring is underground in conduit.

The major track programme to replace the main line in the tunnel and through to Hill Top is well advanced. A temporary construction track has been laid through the tunnel alongside the mainline and the track sections have been welded and attached to plastic sleepers ready for placement. When the main line is lifted, a complete new foundation will be laid, compacted and sealed before the new track is laid.

There were very good attendances over the weekend of the 29th Birthday run, which followed the usual format, Friday, Saturday being interclub whilst Sunday was Public Running. Attendance figures were Friday — 19 visitors, 42 members, Saturday — 140 visitors, 86 members and Sunday — 73 members

Hornsby Model Engineers Co-op Ltd

Location: 29 Mid Dural Road, Galston

Public Running: 2nd Sunday
<http://www.sdr.com.au/hmcel/>

Gosford, NSW

During Sunday the 24th of November 2002, major buckling and distortion occurred to the 5" gauge track adjacent to the diamond crossover of the 7" gauge track on the creek side. Also the 7" gauge track lost several of its hold-down clamps when their securing bolts broke and the track was forced up into the air by around 200mm over a distance of several metres. It would appear that the combined effects of the heat of the sun on the day and possibly some movement of the ground due to the dry weather has caused some of the track expansion joints to close up resulting in such stress being exerted on the rails to cause these events. The 5" gauge track has been repaired and an additional expansion joint has been added at the crossover; also while the buckled section of track was being straightened the curvature was increased to the standard 50 foot radius.

On the same day the 7" gauge track was repaired with new sleeper dogs being fitted and some of the expansion joints being shortened the opportunity was also taken to repair and level some joints on the straight along the bank of the creek.

Central Coast Steam Model Co-op Ltd

Location: Lot 10 Showground Rd, Narara

Public Running: 1st Saturday

Hastings, Vic

BHPWPRS continues to hold monthly meetings on the first Tuesday at 7.30 p.m. HO scale members meet on Friday evenings to use their picturesque layout at the Club House. Private running day is the third Sunday in the month when steam, diesel and electric model locos of 5 inch gauge use the kilometre track which has been

being upgraded during 2002 including the signal system.

November and December each year members shares their enthusiasm with local clubs and societies when they visit and use the venue for celebrations during the festive season. This year willing members completed the new station "Kings Creek" in time for their visits. This attractive station has Heritage Red roof and the wooden structures are painted in a soft beige. The new station completes the track for now and in 2003 after careful planning a lighting signal system will be installed to efficiently load passengers on the busy days.

Members always welcome visitors and any information can be obtained from the Secretary, Mrs C. Hayward, 2 Arthur Street, Seaford, VIC 3198.

BHP Western Port Railway Society

Location: BHP Recreation Centre, Denham Road, Hastings

Running: 3rd Sunday — no public running

Horsham, Vic

Development at our Sawyer Park site continues with station foundations completed and wall frames prefabricated ready to go. Our track will be available to any Easter Convention travellers who feel inclined to call on their way along the Western Highway. We are only 300 metres from the highway at the southern end of Firebrace St. (main street) Horsham. Best to telephone Gail or Colin on (03) 5384 2244 and let us know when you expect to be about. They can arrange for a member to meet you and boil the billy.

Wimmera Live Steam & Model Engineering Inc

Location: cnr. Firebrace & Hocking Sts, Horsham

Public Running: 2nd Sunday

Invercargill, NZ

The committee have pencilled in Labour Weekend, 25 - 26 October for the next "Great Little Train Show". We have received invitations to attend the Riverton Model and Miniatures Gala Weekend as well the Edendale Crankup Day, which is the following weekend in January. Members usually attend the Edendale event, joining with the Gore Model Engineering Club, to provide train rides over both days of the show.

Our November meeting was a visit to the Gore Model Engineers for their monthly meeting. One of the Gore members, Lyall Simpson, takes the prize for the best way of travelling to the meeting, having driven the Burrell Traction Engine from Pioneer Park over to the clubrooms for the evening. With members from both clubs present, the opportunity was taken to discuss the MEANZ update, which contained some important information on safety systems that we need to have in place. With our Society's recently completed safety plan it looks like we will have few difficulties complying with these requirements. The Gore Model Engineers had also been subjected to a spot in-

spection by OSH, while running their portable track, and received a rating of 2, on a scale of 1 to 5, (1 being best and 5 meaning immediate closure). Apparently OSH never give a rating of 1, so 2 is no mean achievement.

On the evening of the November meeting the boat members brought along models for other members to have a drive, with several taking the opportunity. A remark over heard was, "I don't think I have ever seen so many boats going at the one time." In fact there were ten boats in action including a couple that belonged to people that had been passing and seen the activity so went home and brought their models along to try out. It was nice to see some of the new wharf in place and being used. All we have to do now is to get the other part in place and the deck attached.

Southland Society of Model Engineers

Location: Surrey Park, Invercargill

Public Running: 3rd Sunday

Maryborough, Qld

Life Membership of MELSA has been awarded to long time member Bill Stacey. Bob Lisle was named *Maryborough Citizen of the Year* on Australia Day.

Each year our Association has combined with the Heritage Spring Festival for a weekend of activity in Queens Park, with displays of members' work and presentation of awards. This year our city was host to the Maryborough Technology Challenge for human powered vehicles. While these activities drew the public away from Queens Park, we still enjoyed a weekend of fellowship, a great display of workmanship, and we burned lots of good Blair Athol coal. There were some 16 locomotives on hand, visitors bringing engines from Rockhampton and Brisbane. We were entertained by the operation under radio control of Alan Houston's model of QR RM55 *Red Fred* rail motor.

Model Eng. & Live Steamers Assoc, Maryborough

Location: Queens Park, Maryborough

Public Running: Last Sunday

Melbourne, Vic

The end of year meeting was the normal December affair, with members bringing in their best models or tooling projects to be voted on by the audience. There were three categories for judging. Best IC Engine, which went to Warrick for his model of the Atkinson cycle engine. Best tooling or experimental was won by Gary for his ornamental turning attachment to suit a Myford lathe and Best Model went to David for his locomotive. At the end of proceedings extra drinks and sandwiches were consumed in the normal end of year spirit.

January was a fairly low-key meeting as I think most people were still in Christmas and holiday mode, but models on the table always has some interesting objects turn up, which gets the questions coming from the audience.

The club also attended on the 12 of January a special open day at *Polly Woodside* (restored sailing ship on display in Melbourne Maritime Museum) where we were invited to have a stand showing off our models to the public and maybe attract future interested model engineers to our club and the friendships that can evolve.

Melbourne Society of Model & Experimental Engineers.

Location: Meetings are held 2nd Friday of Month at 92 Wills St Glen Iris 8.00pm start.

Public Running: None.

Millswood, SA

In order to accommodate a little more comfort for our patrons SASMEE has manufactured three "all in one" benches and seating identical to the existing one situated in the old exhibition track area. This one was purchased several years ago and is gaily plated with treated hardwood planks for table top and seats.

For many years our late member, Ralph Skewes, was an advocate for having access from one track to another in order to create a greater variation to "play day" running. Although Ralph's original siting for the crossing was not feasible it was decided that a site immediately past the Millswood Station level crossing was the most appropriate position in which to have access from one track to the other. This position serves two purposes: (a) Easy transfer of passenger cars to the 5 g. track ex carriage shed and (b) 5 g. trains able to transfer to the 7 1/2 g. dual track on play days. The crossing has been installed and has blended in very well. It will be known as "SKEWES CROSSING" and a name affixed close by.

Well, who would have thought that our hobby of running miniature trains would be put in the same category as a showground ride such as the Spin Dragon, Ferris Wheels, Dodgem Cars and so on. As strange and ludicrous as it may sound, according to Government Legislation we are classified as an Amusement Device as from July 2001. It is a long story but basically since the Spin Dragon accident at the Royal Show in 2000, the SA Government has tightened up dramatically on the laws relating to show rides and amusement devices. Miniature railways operated by the model engineering clubs in SA are caught up in it.

South Australian Soc of Model & Exp. Engineers

Location: off Millswood Cres., Millswood

Public Running: 1st Sunday & 3rd Saturday

Morphett Vale, SA

As mentioned in last year's *Club Roundup* news, we are able to run longer trains with the construction of the Sub Main Line and, bigger locos (incl. John Wakefield's new 2-10-4 monster). However, two long trains only are possible as with more it becomes a problem when passengers are alighting because the long train would foul the adjacent platform tracks preventing a following train from entering the station. The only way to overcome this problem is

to extend the platform tracks, not an easy thing to do. The initial idea was to extend the eastern end platform tracks, however, this required a lot of work, shifting signals, power operated switches, fences, retaining walls, earth fills, underground cables and air lines, a major undertaking and with the limited work force the idea was shelved.

It was then considered that maybe extending the western end would be better. After considerable deliberation it was decided to proceed as it required less major work, no shifting switches, fences, walls, etc. It did however require the removal of a crossover and the construction of a diamond crossover (quite a challenge for our per way man, Karl Hampel) and the refurbishment of two switches, plus three extra signals, two shunt and one Main Line signal. This work is now well under way and hopefully will be completed for Easter.

We made an application to the council for the extension of the station shelter to extend over track no.3 as we were eligible for a SA Government Community Grant. This has been approved and a tender for its construction accepted. Hopefully this will be completed early February. This added roof extension will completely block the view for the signalman when observing platform tracks and we are now looking at using CCTV. More about that as it develops.

The rolling stock department reports that the club is running a total of 16 new gondola type cars, 9 club and 7 private, plus the 8 original privately owned step-over cars. At the moment this has satisfied our needs.

Morphett Vale Railway Inc

Location: Wilfred Taylor Reserve,

Wheatshed Road, Morphett Vale

Public Running: 2nd & 4th Sunday

Mudgee, NSW

Once again we can claim to have had a fairly successful Wine Festival Run period. The first weekend was the quietest in terms of visiting locos, the second and third ones were very good. Over the course of the three weekends we had visiting locomotives from Illawarra, Western Districts, Bankstown, Lake Macquarie, Orange, Galston and Warner in Queensland, while visitors were also in attendance from Tamworth, Blue Mountains and one from Melbourne with his loco. Passenger wise we sold a total of 633 single ride tickets and 198 unlimited ride tickets.

For the first time that anyone at the club can remember, we have had to buy in a truck load of water, —nearly 2000 gallons — as our tanks were just about empty.

On the weekend of 15-16 February we have hired two CPH "Tin Hare" railmotors from the Lachlan Valley Railway at Cowra. The idea is to run several trips over the weekend from Lithgow, Mudgee and Kandos.

Mudgee Miniature Railway

Location: Cassilis Road, Mudgee

Public Running: 2nd Sunday, Easter and Wine Festival

Perth, WA

Castledare enters its 40th year of operation with a programme of steady growth. Fabrication of steelwork for the extended 5" gauge shed has commenced, and site works should start soon. Most of the trackwork for the Fern Road re-alignment is now complete and the earthworks are the next task on this project. The new water bore is proving its worth, with grassed areas starting to look healthier despite the hot summer.

Passenger numbers on recent run days have been steady. Improved fire precautions have been enforced, with loco spark arrestors under scrutiny, and mobile fire fighting packs installed on each train. A hose is also to be installed from the new bore to provide fire fighting water in the Canning area.

The club Christmas party was well attended. A professional caterer was brought in to provide the Christmas dinner, and the event extended into an enjoyable night run.

Locomotive construction by club members is in a healthy state. There are at least five steam locomotives at varying stages of completion, together with three diesel outline locos; one battery electric, one petrol electric and one petrol mechanical.

Our club can be contacted via the secretary, Ken Belcher, on (08) 9375 1223, email: skbelcher@wiredcity.com.au

Castledare Miniature Railways of WA Inc

Location: Castledare Place, Wilson

Public Running: 1st Sunday

<http://dl1565.criprod.com/cmr/>

Salisbury, SA

It is full steam ahead for the members of Penfield MES as they gear up for the 47th Annual AALS Convention at Easter. The rail track has been completely redesigned and a new track built. Stage one of the redevelopment comprising a loop of 450 metres circling the newly rebuilt racing car track, club rooms and boat pond, complete with new workshops, carriage sheds, elevated steaming bays complete with traverser, turntable, unloading ramp and a brand new station that is already up and running. The club rooms have been renovated with the installation of ducting for air conditioning, a false ceiling and additional lighting. The HO railway has been enclosed and large viewing windows fitted to keep little fingers away from the trains.

The 540 metres of track comprising stage two is now complete. Plastic sleepers have now been installed under at least three quarters of the new track and continuing. It is anticipated that this section of track will be ready for use by the end of January.

The "flangeless wheel brigade" has not been forgotten and a new traction engine track is being built. Traction engines can be unloaded at or near the steaming bays and could operate approx. 150 metres along the roadway out to a loop of approx 277 metres within the stage two area of development. There is an extension which then

runs out about 245 metres to the water meters near the electricity sub station. The entire track is within the club grounds so there is no need of a water bag and packed lunch! We look forward to seeing road steam vehicles in action

Penfield Model Engineers Society Inc.

Location: Penfield Avenue, Salisbury

Public Running: Last Sunday

Wagga Wagga, NSW

The WWSME held its 14th Annual Invitation Run on the first weekend of November and welcomed approximately 50 visiting locomotives, 2 steam road vehicles and 350 enthusiasts or family members. The event was held under high fire danger conditions, which meant that steam running was restricted to the main loop leaving the diesels to enjoy the longer branch to Museum.

Former Deputy Prime Minister, Tim Fisher who is a noted rail enthusiast and Envoy for the Australia - Asia Railway, declared the event open and the Mayor of Wagga Wagga welcomed the many guests.

The annual award for the best achievement was presented to Bob Nash of the Morphett Vale Club for his Southern Pacific steam locomotive while the award for the best new locomotive went to Andrew Meirisch of Diamond Valley for his Victorian Y Class Diesel-Electric.

Following delivery of another huge pile of earth fill, a contractor has been engaged to finish profiling the major embankments of the spiral extension. As all track steel has been purchased and a number of points have been fabricated, it is hoped that track laying may commence as soon as the cross over area is constructed and gradients are finalised.

Wagga Wagga Society of Model Engineers Co-op Ltd

Location: Botanic Gardens, Willans Hill, Wagga Wagga

Public Running: 1st & 3rd Sundays

<http://www.wagga.net.au/community/trains/>

Warner, Qld

We started November with the annual Christmas dinner held at the Bracken Ridge TAFE. Anita McDicken (you ought to be congratulated) once more organised what turned out to be a super night. She chose TV advertisements as the theme for the night and many innovative techniques were used by those present to mimic the ads to the amusement of the gathering. I mentioned last issue that I would report on the Trophy day in November. The following were judged winners this year (by Jim Jackson and Eric Evans). The Championship Cup went to John Andrews for his 5" gauge *Marie Estelle*, runner up was Dale McLennan's 5" gauge QGR PB15. The other entry was a 7" gauge *Northumbrian* by Bill Ferris. The Unfinished Locomotive trophy went to Bill Williams for his 5" gauge Southern Pacific Atlantic while the Myford Cup encouragement award went to Bill Crompton for his 5" *Simplex*. The Australian Prototype tro-

phy went to Dale McLennan for his 5" gauge PB15 and 5" gauge NSWGR S trucks and the Special Encouragement Award went to Lee Dannenberg (Junior member) for his 5" gauge *Sweet Pea* frames. Other exhibits included these unfinished locomotives — Barrie Beale 5" 0-6-2T Fowler, Lloyd Dannenberg 7" Nickel Plate Berkshire, Neil Dannenberg 7" 2-6-6-4 C and O Mallet, Hugh Elsol 5" *Blouffy*, Eric Evans 7" QGR C16 (display only), Dallas Golding 5'0-6-2 Perry, Mike Ruska 7" PB15 Tender, Warren Starr 5" NSWGR AD60 Garratt and Colin Whatley 5" NSWGR C36. Also on display was a pipe bender by John Andrews, a 5" partly complete 442 battery electric locomotive and loco re-railer by Paul Kilminster, a gauge 0/1 (32-45mm) coal fired 0-4-2T *Petrie* by Steve Malone, a R&B Fractional HP Stationary engine by Darryl Muller and a hit and miss engine by Ray Parrinder. In December we celebrated a successful year in a festive way with train and tractor rides, games for the young at heart and later a special guest arrived behind the club locomotive. A BBQ tea followed in a relaxed and friendly atmosphere, a great way to round off the year and to gaze back at what we have achieved.

QSMEE - AUGUST 2003 - TRACK AND TENT Run — An invitation is extended to kindred societies to join us at our Warner track site for a run in the pleasant Brisbane spring with warm days and mild nights. (See *Coming Events*). Circulars will be forwarded to Societies early in 2003. (For further details contact Hugh Elsol, (07) 3849 5573).

If you are ever up our way we would welcome a visit. To visit, contact the Secretary, PO Box 322 Everton Park 4053. **Note:** All persons wishing to run equipment at our site must have AALS Insurance.

Qld Society of Model & Experimental Engineers Inc

Location: 122 Warner Road, Strathpine

Running Day: 2nd Sunday except December, by invitation. No public running

<http://www.steammachine.com/qsmee/>

West Ryde, NSW

The new traverser and the tracks connected to it are now in place on the elevated track. The steelwork has been galvanised and the arrangement is fully functional.

The ground level railway has been performing fairly well and the track seems to be retaining its position on the weed matted areas. Now the road base pit is completed some effort can be expended on bringing the rest of the track up to the same standard. In general, the track currently to the old standard has not needed any urgent attention as it has been long term embedded on a good alignment and expansion doesn't seem to bother it. However, sleepers need replacing and this will be the first major use of the new plastic sleepers.

The public are now prevented from entering the northern end of the grounds following removal of the old bridge and associated concrete steps. New galvanised

steel gates have been provided, the area levelled and restored and is much improved.

Sydney Live Steam Locomotive Society

Location: Anthony Road, West Ryde

Public Running: 3rd Saturday (pm)

<http://www.pnc.com.au/~wallison/sls/htm>

Wollongong, NSW

Work on the disabled toilet is progressing satisfactorily and the 'official opening' is not too far off. At long last our 'you beaut' coal crusher has now been fenced in with the roof extended over it to protect it from the elements and fitted out with lighting so that when you're on 'dogwatch' crushing coal at 2 am you can see what you're doing.

The August running day dawned rather overcast and with 'showers' predicted, the general feeling of the members was that it would be a bit of a 'laid back' day. My, oh my, what an understatement! The ILS had their work cut out on this running day as we too broke our previous 'best yet', it took exactly 12 months to do, but we done it.

The Sydney Water Project — well, the big hole gets bigger! At long last it would appear that the contractors have finally got it all together as it was around August they were down about 12.5 metres with one excavator 'in the hole' lifting the spoil up one level to the next excavator who in turn then lifts it from this level and loads it into a truck. Eventually, when they're down far enough there are some large steel shutters to go in the hole and then they fill the hole up with concrete. In order to get the shutters into the hole and the first excavator out a 100 ton crane had to be brought on site to do the job. It was mid September when they reached the level required for the bottom of the holding tank and it was then things should have started to go smoothly BUT, whoever drilled the test hole to 'prove' the ground went a bit too far and they found themselves with a natural man made 'spring' with water gushing in and filling up their hole! The first batch of concrete was poured on 26th September. And here's a bit of 'useless information' that will knock the socks off you ... Did you know that there will be

90 tons of steel reinforcing bar (reco) in the ground to hold it all together along with approximately 230 cubic metres of concrete! The approx cost of the job is \$1.1 million.

Illawarra Live Steamers Co-op Ltd

Location: Stuart Park, Virginia St, North Wollongong

Public Running: 4th Sunday

<http://www.16.brinkster.com/ils2500>

Farewell

We say goodbye and thank you to these model engineers who have passed on:

Brian Andrea (Canberra SMEE)

Doug Batty (Central Coast SMC)

Alan Kersey (MELSA Maryborough)

Frank Pemberton (Manukau LS)

Ian Pettersen (Diamond Valley Railway)

Cliff Widmer (BCSME Burnaby)

Danny Wilhelm (BCSME Burnaby)

and extend our condolences and best wishes to the family and friends they leave behind.

Coming Events

28 February to 2 March

Berry Railway Birthday Run — Berry

Come and join us as we celebrate the first birthday of our track. 7.25" gauge locomotives and rolling stock, traction engines all welcome. Current boiler certificates and AALS standard wheel profiles required. Warm welcome and friendly relaxed atmosphere. No public running. Stacks of room to camp on site or B&B or motel accommodation nearby. RSVP to assist with catering. Phone Les Irwin on (02) 4464 1201 (evenings) or email piglet@virtualcity.com.au

15 March

All Commers Day — Box Hill, Vic

The members of the Box Hill MSRS once again invite you all to join in a great day of trains and fun at their track in Elgar Park (Melway 47 B4). Contact (03) 9898 2671

17 to 21 April

47th AALS Convention — Salisbury North, SA

The Penfield MES are hosting the next AALS Convention. Information packs and registration forms have been sent out to clubs. For full details contact the Convention Secretary, PMES, PO Box 792, Salisbury SA 5108.

29 April to 14 May

North Queensland Safari — various

The Northern Queensland Safari goes west this year. The itinerary is Maryborough 29 April, Rockhampton 1 May, Mackay 3-4-5 May, Barcardine 10-11 May, Toowoomba 14 May (normal run day 18th May). Contact Neil MacKenzie (07)32612042 or e-mail: norma.mac@bigpond.com

17 to 19 May

Roadsteam Event — Inverell, NSW

Inverell Pioneer Village Autumn Run for all Roadsteam engines running or static exhibit. A BYO event. Come along and help break the drought! To be held annually on the third weekend in May. Mark it on your calendar and contact Gordon (02) 6722 4272 or Peter (02) 4951 2369

17th to 18th May

10th Birthday Weekend — Thames, NZ

Thames Small Gauge Railway invite all model engineers and their spouses to join in celebrating our 10th Birthday. 900 metres of S' and 7.25" ground level track on the Thames foreshore is in pleasant surroundings on the Brown Street reserve. A birthday dinner is planned for the Saturday evening. Registrations essential. Visiting locomotives welcome. Boiler certificates required for steamers. Contact Secretary, Phil Macdiarmid, 454 Kauaeranga Valley Rd, RD2, Thames Ph (07) 868 9914

31 May

NSW AALS Interclub Day — West Ryde

Everyone is welcome to the NSW Interclub day on 31 May 2003 at the Sydney Live Steam Locomotive Society grounds at Anthony Rd, West Ryde. Locomotive unloading access via Park Avenue. More details will appear in the May-June issue of AME.

7 to 9 June

Hot Pot Run — Wollongong, NSW

Illawarra Live Steamers is holding its 9th Annual Hot Pot Run over the June Long Weekend. Enjoy a wintery weekend warming up with steam trains and continuous steamy hot soup. Have an enjoyable weekend with over 50 locomotives and rolling stock, night running. Entry fee at least two cans of soup per person for the weekend. Camping on grounds and area for caravans with hot shower. For further information contact ILS Secretary on 0410 569 663, e-mail: dgbunker@acay.com.au or look us up at www.16.brinkster.com/ils25000

22 June

Bracken Ridge Central Steam Railway

Be a part of the Anniversary of the Bracken Ridge Central Steam Railway. Now in its eighth year the railway draws a varied range of locos for the enjoyment of the public. Drivers and crew will be catered and Awards will be made for the Best Presented Queensland Loco and Best Open Class Loco. Contact Neil Mackenzie (07) 3261 2042

5th to 6th July

Timbertown Steam Festival — Wauchope, NSW

Yes, our annual rally is on again in Timbertown, Wauchope. 250 metres of ground level 5" and 7.25" track (steaming bays are under construction). Steam and Oil Engines. Contact Ian Strawbridge (02) 6587-4455 or www.oilyandsteam.com

5 to 6 July

Bendigo Model Engineering Exhibition

Bendigo SME invites you to attend and take part in the biennial Bendigo Model Engineering Exhibition. It will feature numerous displays, working models, demonstrations and a range of stalls selling modeling tools, books and engines. The venue is again the Kangaroo Flat Leisure Centre, Browning St, Kangaroo Flat. Admission: adults \$6.00, children \$2.00 and families \$12.00. For further info. And entry forms please contact secretary Ray Hayward (03) 5442 4500 or Gordon Hunter (PR Officer) (03) 5443 4887, mob. 0413 936 790, email: huntergr@diessel.net.au

8 to 10 August

"Track & Tent" Run — Warner Qld

QSMEE extend an invitation to kindred societies to join us at our Warner track for a run in the pleasant Brisbane spring with warm days and mild nights. August is also one of the driest months. The track will be open for private running only — there will be no public. Also it means that there is no clash with other SE Queensland society running days for those wishing to run on other tracks and it is the first weekend of Brisbane's RNA Exhibition. Preliminary Programme is: Friday — evening welcome - nibbles and refreshments, Saturday — day and night running, light lunch, evening barbecue, Sunday — breakfast, day running, light lunch and farewells. There will be nominal charges for light lunches, BBQ and breakfast, camping on site and bottomless tea and coffee. Circulars will be forwarded to Societies soon. Further details call Hugh Elsol, (07) 3849 5573.

Pichi Richi Pathfinder — for those interested in real railways

There can be little doubt that the Pichi Richi railway is one of the finest examples of a preserved historical railway, certainly in Australia and arguably in the world. Not only does the railway operate over an extremely scenic route in the lower Flinders Ranges in SA but it possesses an amazing collection of ex SAR and CR rolling stock to form one of the best museums one could wish to find. It is a real "Aladdin's Cave" of Australian Railway memorabilia of the early 1870s.

For these reasons it is planned to have a railfan weekend for those interested in full size (3'6" gauge) railways, as distinct from models, on the weekend immediately following the Easter Convention in SA, i.e. **25-27 April 2003**. For those with the time to spare, the cost will be minimal and the experience rewarding.

The rail track from Port Augusta was built north through Quorn and Hawker during the 1870-80's to give access to the hinterland for pastoral development, and reached as far north as Oodnadatta by 1890. It was intended to have been part of the North - South railway (currently being completed 100 years later), and reached Alice Springs by 1929. Much of the rolling stock now preserved at Quorn dates from the origin of the line. When the transcontinental railway was envisioned as part of WA's agreement to join the Commonwealth in 1901, part of the planned route utilized this, already existing railway from Pt Augusta via Quorn and Peterborough to Terowie (where the gauge changed from 3'6" to 5'3") to Adelaide and thence to Melbourne and Sydney, etc. This route continued from the time of the "Trans" opening in 1917 until a new route was established via Port Pirie in 1937. So, for 20 years the Pichi Richi was part of the east west crossing Australia. It was also part of the north south route to Alice Springs until the new standard gauge line was built to the west of the Flinders Ranges in the early 1950's after which time it progressively became more redundant, until, thankfully, preserved and restored by the current dedicated group of enthusiasts, the PRR. It is currently one of SA's major tourist attractions with railfans and general public alike.

It is for this reason that the current Northern Rail Fiesta has been planned for the weekend following Easter for the benefit of any "Eastern Staters" or their visitors attending the convention in Penfield next Easter. The main attraction for the weekend will be the **Saturday** run (steam hauled) from Quorn to Pt Augusta and return. This will take up the bulk of the day leaving little time for the other attractions. In Saturday evening it is planned to hold a banquet at the Transcontinental Hotel (taking up the entire evening) which should be a most enjoyable occasion for all concerned.

Sunday offers a number of choices. The museum mentioned above will absorb a fair slice of the day to do it justice (for railfans) but there is also a 5" gauge railway in Quorn itself, owned by a fellow enthusiast Kevin Dale, who makes all railroaders welcome.

There is also an excellent 5" gauge track at Homestead Park in Pt Augusta, available to 5" gauge model railroaders, and of course the park itself is well worth a visit, being a very good historical record and re-creation of early station life in and around Pt Augusta.

There is also an excellent 7 1/4" gauge track in a park at Clare about 100k north of Penfield and virtually on the road to Quorn. The plan is to visit this railway on the way north on **Friday 25th**. If traveling with a 7 1/4" locomotive and wishing to run on this track, it would be wise to go to Clare the previous evening and stay there overnight to allow an early start for scanning. The Clare club will welcome an entourage on Friday 25th, and has kindly offered to provide a BBQ lunch. The Clare Railway is located in Inchiquin Park as part of the Clare Country Club about 2k North East of the township — well signposted in the main street.

After the day's activities in Clare it would be advisable to travel to Quorn that evening to ensure being there in plenty of time for the main event, the Steam Train trip which departs on **Saturday at 10:30 a.m. and returns at 4:30 p.m.** (Quorn is approx 200 kms from Clare)

PLEASE NOTE: Rail tickets are available on the day — **no money to be paid to organisers** — but we would appreciate advance notice of your intentions for planning purposes. If suffi-

cient numbers travel a block booking will attract a 10% discount.

Costs have been kept to a minimum, as none of us has money to burn, but all the above is extremely good value for money, enjoyment wise.

Accommodation is your own responsibility and because this is the peak season tourist and weather-wise, it will be wise to book early so you don't miss out. A choice of accommodation is available, as follows:

The Mill Motel — 3 star, \$85.00 per room with a min. of 2 nights. These are double rooms with up to 3 extra single beds at \$15.00 each. Continental breakfast \$6.00. 12 rooms avail. (08) 8648 6016
Hotel Transcontinental — Normal hotel accomm. incl. single rooms. Prices vary — single \$25.00 to \$30.00, double \$40.00 to \$60.00 per night.

There are also 3 other hotels all similarly priced —

The Austral — also has motel rooms, Single \$27.00 p/n, Motel Units \$69.50 p/n. (08) 8648 6017

Criterion — Single room \$45.00 p/n. Double room \$56.00 p/n. (this can take 3 extra people for total \$65.00 p/n. (08) 8648 6018
Junction — (08) 8648 6025

Quorn Caravan Park — Cabins for 2 people \$59.00 (Can take up to 4 extra at \$6.00 ea.) On site vans \$36.00 for 2 people. (Can take 2 more at \$5.00 each) Small cabin 2 people only \$43.00.

Clare:

Bentley's Hotel (08) 8842 1700

Clare Hotel (08) 8842 2816

Clare Central Motel (08) 8842 2277

Clare Caravan Park (08) 8842 2724

CONTACT NUMBERS:

Quorn 5" Gauge Railway — Kevin Dale (08) 8648 6909

Port Augusta 5" Gauge Railway — Ernie Riding (08) 8642 3853

Clare Railway 7 1/4" gauge — Don Springbett (08) 8842 3075

If you are interested in participating in any or all of these planned activities, please **copy and return this form by 31 March 2003** so that events can be organised. **Do NOT send any money.**

Booking Form

Mail to:- **M. Hill, 69 Victoria Street, Williamstown, Vic 3016**

I, _____ (Please Print)

desire to participate in the Pichi Richi Railway Fiesta over the

weekend of 25-26-27 April 2003.

There will be _____ Male

_____ Female members in my party.

Names:- _____

(for identification) _____

• I wish to attend Clare Railway (No Cost) ☐

• I wish to travel by PRR steam train to Port August & ☐

return on Saturday 26th April 2003

Fores for train journey- Adult \$58.00

Pensioner \$52.00

Children under 14 or Student \$19.00

Fores above are subject to discount if numbers sufficient.

• No. for Saturday evening Banquet ☐

Approx \$20.00 (excluding drinks)

• Accommodation — Transcontinental Hotel ☐

Double Room \$40.00 ☐

Single \$25.00 ☐

Specify which nights accommodation required.

Australia and New Zealand Model Engineering Club Listing — 2003

Each entry has three (or four) dot-points following the club name containing the following information:

- **Location of Miniature Railway**
- **Public running day (each month)**
- **Postal address**
- **Website**

This listing has been sorted alphabetically by State or Island and Club Name (in that order). There are bound to be slight problems with the list but it is as up-to-date as we know it. Club Secretaries please check your club's details for errors, or if your club is not listed, please inform *AME* as soon as possible. The list is usually kept up-to-date from information supplied by club newsletters. Unfortunately, nearly all of them do not contain basic information such as public running days, hence the many "unknowns".

If your club has a **Website** you can have a link placed on *AME's* Internet Club List page by sending an **Email** to ame@bigpond.com with the subject "Club List". Please double check that the link URL you are supplying is correct.

Some clubs are listed as "No public running" but welcome visiting model engineers. The protocol is to contact the club first and arrange a mutual time for your visit. Members of clubs with AALS insurance are reminded that they should inform their home club of their intention visit other clubs.

This listing is updated and published every two years. Details will be updated on the *AME* website as they are advised to us.

Australian Capital Territory

Canberra Society of Model & Experimental Engineers Inc.

- KINGSTON, Geijera Place
- Last Sunday
- PO Box 4462, Kingston, ACT 2604
- www.canberramodelengineers.com

New South Wales

Bankstown Steam Locomotive Society Co-Op Ltd

- BANKSTOWN, Ruse Park, Hoskins Street
- 2nd Saturday
- PO Box 175, Pyrmont, NSW 2009
- <http://www.webmaker.com.au/bsls>

Bathurst Miniature Railway Co-Op Society Ltd

- BATHURST, John Matthews Sports Complex, Durham Street
- 3rd Sunday
- PO Box 574, Bathurst, NSW 2795

Berry Railway Inc.

- BERRY, Princes Highway
- No public running
- PO Box 324, Berry, NSW 2535

Blue Mountains Railway Society Co-Op.

- BLAXLAND, Corner of Graham and Haymet Streets (Wascoe Siding)
- 1st Sunday - except January.
- PO Box 20, Glenbrook, NSW 2773

Central Coast Steam Model Co-Op Ltd

- NARARA, Lot 10 Showground Road
- 1st Saturday
- PO Box 692, Gosford, NSW 2250

Hornsby Model Engineers Co-Op Ltd

- GALSTON, 29 Mid Dural Road
- 2nd Sunday
- PO Box 172, Galston, NSW 2159
- <http://www.sdr.com.au/hmeci/>

Illawarra Live Steamers Co-Op Ltd

- NORTH WOLLONGONG, Stuart Park, Virginia Street
- 4th Sunday
- PO Box 173, Woonona, NSW 2517
- <http://www.l6.brinkster.com/ils2500>

Jerilderie Steam-Rail & Heritage Club

- Jerilderie, (Natural reserve in town centre)
- 2nd and 5th Sunday
- C/- 57 Bolton Street, Jerilderie, NSW 2716

Lake Macquarie Live Steam Locomotive Society Ltd

- EDGEWORTH (Newcastle), Off Velinda St.
- Last Sunday (except Dec)
- PO Box 4040, Edgeworth, NSW 2285

Mudgee Miniature Railway Co-Op Society Ltd

- MUDGEE, Cnr of Cassilis Road & Buckaroo Lane
- 2nd Sunday
- PO Box 373, Mudgee, NSW 2850

Museum Miniature Railway Society

- YANCO, Powerhouse Museum, Binya Street
- Unknown
- Unknown

Orange Society of Model Engineers

- ORANGE, Matthews Park, Moulder Street
- 2nd Saturday
- PO Box 1485, Orange, NSW 2800

Pacific Coast Railway Society Inc.

- CASINO, Cnr of Queensland Rd and West St
- Every Sunday
- PO Box 176, Casino, NSW 2470
- www.casinominirail.com/

Richmond River Mini-Railway & Model Engineers Inc

- 2215 Coraki - Ellangowan Road, ELLANGOWAN
- None
- PO Box 269, Casino, NSW 2470

Southern Highlands Model Engineers Inc.

- ROBERTSON, Pie Shop corner, Illawarra Highway.
- Booked runs only
- Contact: (02) 4868 2404

Sydney Live Steam Locomotive Society Co-Op Ltd

- WEST RYDE, Anthony Road
- 3rd Saturday
- PO Box 124, West Ryde, NSW 2114
- <http://www.pnc.com.au/~wallison/slsis.htm>

Sydney Society of Model Engineers Inc.

- ST MARYS, R53 Luddenham Road
- Last Sunday except Dec.
- R53 Luddenham Road, St Marys, NSW 2760

Tamworth & District Model Engineers

- Contact John Buckley (02) 6765 3783
- None
- C/- 1 Wade Ave, Tamworth, NSW 2340

Tweed Valley Miniature Steam Railway

- DURANBAH, Duranbah Road, Tropical Fruit World
- 2nd and 4th Sundays (no public)
- 2 Lansell Ave, Currumbin, NSW 4223

Twin Lakes Railway

- BUDGEWOI, Yellow Rock, Macleay Drive
- None
- 13 Garnet Rd, Pearl Beach, NSW 2256

Wagga Wagga Society of Model Engineers

- WAGGA WAGGA, Botanic Gardens, Willans Hill
- 1st and 3rd Sundays
- PO Box 119, Mt. Austin, NSW 2650
- <http://www.wagga.net.au/community/trains/>

Warrindah Model Engineers

- No track
- No public running
- ISS Willandra Rd, CROMER, NSW 2099

Western Districts Live Steamers Co-Op Ltd

- CANLEY VALE, Fairfield Showground, Smithfield Road
- Every Saturday (members 3rd Sun)
- PO Box 403, Mt Prichard, NSW 2170

Queensland

Bracken Ridge Central

- BRACKEN RIDGE, McPherson Park, Denham Street (Steam locos only)
- 4th Sunday.
- 20 Talgai St, Bracken Ridge, Qld 4017

Brisbane Live Steamers and Model Engineer Society Inc.

- WYNNUM WEST, Wynnum Road
- 1st and Last Sundays
- PO Box 2244, Tingalpa, Qld 4173

Grandchester MLSA

- GRANDCHESTER, 2 Ipswich Street
- 1st Sunday
- Lot 2 Gatton St, Grandchester, Qld, 4340

Logan Model Engineering Society Inc

- WOODRIDGE, Ewing Park, Ewing Road
- 2nd and 4th Sundays
- PO Box 927, Slacks Creek, Qld, 4127

Mackay Society of Model Engineers Inc.

- MACKAY, Muller Park, Planlands
- 1st Sunday
- PO Box 5267, Mackay Mail Centre, Qld 4741

Model Engineers & Live Steamers Association Inc — Bribie Island

- BRIBIE ISLAND, Toorbul Street, Bongaree
- 3rd Sunday
- PO Box 170, Bribie Island, Qld, 4507

Model Engineers & Live Steamers Association — Gladstone

- CALLIOPE, Bruce Highway
- Unknown
- PO Box 1112, Gladstone, Qld 4680

Model Engineers & Live Steamers Association Inc. — Maryborough Qld.

- MARYBOROUGH, Queen's Park
- Last Sunday
- PO Box 355, Maryborough, Qld 4680

Model Engineers & Live Steamers Association — Rockhampton

- ROCKHAMPTON, Leichhardt Park, corner of Cambridge and Campbell Streets
- 1st Sunday (pm)
- PO Box 1463, Rockhampton, Qld 4700

Queensland Society of Model & Experimental Engineers

- STRATHPINE, 122 Warner Road
- No public running
- PO Box 322, Everton Park, Qld 4053
- <http://www.steammachine.com/qsmee>

Redlands Model Engineers Club Inc.

- CAPALABA, Sir John Frederick's Park, Banfield Lane
- 1st and 3rd Sundays
- PO Box 5098, Victoria Point, Qld 4165

South East Queensland Live Steamers

- MARSDEN
- Unknown
- 760 Brown's Plains Rd, Marsden, Qld 4132

Sunshine Coast Railway Modellers Society Inc

- NAMBOUR, Sundale Park, Florence Street
- 4th Sunday (ex. December)
- PO Box 234, Nambour, Qld 4560

Toowoomba Live Steamers Inc.

- TOOWOOMBA, Kearney Springs Historical Park, Spring Street
- 3rd Sunday (pm)
- PO Box 916, Toowoomba, Qld 4350

Townsville and District Society of Model Engineers Inc.

- TOWNSVILLE SOUTH, Lou Lister Park, Boundary Street
- Last Sunday
- PO Box 90, Castletown, Qld 4812

South Australia

Adelaide Miniature Steam Railway Society

- PROSPECT, 370 Regency Road
- 4th Sunday
- PO Box 205, Prospect, SA 5082

Clare Valley Model Engineers

- CLARE, Inchiquin Lake Park
- 2nd and 4th Sunday from 1:30pm
- 17 Eastview Street, Clare, SA 5453

Morphett Vale Railway Inc.

- MORPHETT VALE, Wilfred Taylor Reserve, Wheatheaf Road
- 2nd and 4th Sundays (pm)
- PO Box 743, Morphett Vale, SA 5162

Penfield Model Engineers Society Inc.

- SALISBURY, Penfield Avenue
- Last Sunday of the month
- PO Box 792, Salisbury, SA 5108
- <http://www.picknowl.com.au/homepages/loanlynn/pmesone.htm>

Port Augusta Model Engineers Inc.

- PORT AUGUSTA, Homestead Park, Elsie St.
- 3rd Sunday
- S Higginson St., Port Augusta, SA 5700

Roseworthy Railway Club Inc.

- ROSEWORTHY, University of Adelaide, Mudla Wirra Road
- 3rd Sat Jan-Mar; 3rd Sun May-Dec
- PO Box 302, Roseworthy SA 5371.

South Australian Society of Model & Experimental Engineers Inc.

- MILLSWOOD, Off Millswood Crescent
- 1st Sunday and 3rd Saturday
- PO Box 208, Goodwood, SA 5034

Tasmania

Evandale Light Railway and Steam Society Inc.

- EVANDALE, Rear of Falls Park
- Every Sunday
- PO Box 96, Evandale, Tas 7212
- www.evandale-light-rail.org.au

Hobart Miniature Steam Locomotive Society Inc.

- LINDISFARNE, 275 Flagstaff Gully Road
- PO Box 322, Rosny Park Tas 7018
- None

Van Diemen Light Railway Society

- DON, Don River Railway
- Most Sundays and Public holidays
- C/o Post Office, Don, Tas 7310

North West Model Engineering Society

- ULVERSTONE, Maskells Reserve
- 1st and 3rd Sunday
- 51 Alexandra Road, Ulverstone, Tasmania 7315

Victoria

Altona Miniature Railway Inc.

- ALTONA NORTH, Paisley Park, Blenheim Road
- 3rd Sunday
- PO Box 387, Altona, Vic. 3018
- <http://travel.to/amt>

Ballarat Society of Model Engineers Inc.

- WARRENHEIP, Dorrington Road
- No public running
- PO Box 351, Buninyong, Vic. 3357

Bendigo Society of Model Engineers

- Site being considered
- No public running
- C/- 107 Bob St., White Hills, Vic 3550

BHP Western Port Railway Society

- HASTINGS, BHP Recreation Centre, Denham Road
- No public running
- 7 Gavan Crt., Frankston Vic. 3199

Box Hill Miniature Steam Railway Society Inc.

- BOX HILL, Cnr Elgar and Belmore Streets
- 2nd and 4th (ex Dec.) Sundays
- PO Box 61, Box Hill, Vic. 3128

Campaspe Valley Railway Inc.

- ECHUCA, Rotary Park (off Campaspe Esplanade)
- 1st Sunday (April-Dec)
- PO Box 151, Echuca, Vic. 3564

Diamond Valley Railway Inc.

- ELTHAM, Eltham Lower Park, Main Road
- Every Sunday and most public holidays
- PO Box 245, Eltham, Vic. 3095
- <http://www.dvr.com.au>

Euroa Miniature Railway Inc.

- EUROA, off Turnbull Street via Hunter Street
- 4th Sunday
- 2 Nelson Street, Euroa, Vic. 3666

Geelong Society of Model & Experimental Engineers

- GEELONG, Point Richards (near Portarlington)
- 2nd Sunday
- PO Box 442, Geelong, Vic. 3220

Gippsland Model Engineering Society Inc.

- TRARALGON, Newman Park, Peterkin Street
- 4th Sunday
- PO Box 569, Morwell, Vic. 3840
- www.geocities.com/gmes1978/

Gisborne Vintage Machinery Society Inc

- GISBORNE, Webb Crescent
- 1st Sunday
- PO Box 99, Gisborne, Vic. 3437

Lake Hume Model Engineers Inc.

- WODONGA, Diamond Park, Lincoln Causeway (Hume Highway)
- 3rd Sunday
- PO Box 1017, Wodonga, Vic. 3689
- <http://www.cnl.com.au/users/hme>

Loddon Miniature Steam Locomotive Society Inc.

- EDINGTON, McColl Street
- 4th Sunday
- 17 Lowndes St, Bendigo, Vic. 3550

Melbourne Society of Model & Experimental Engineers

- No track
- Meetings: 2nd Fri, 92 Wills St, Glen Iris, 8pm
- 11 Kirkwood Drive, Camberwell, Vic. 3124

Did you update your records?

Mooroolbark & District Miniature Railway & Steam Club Inc.

- KILSYTH, Kiloran Reserve, Hawthorn Road
- 4th Sunday
- PO Box 231, Mooroolbark, Vic. 3138

South Western Model Engineers

- COBDEN, Grayland Street
- 3rd Sunday
- PO Box 14, Cobden, Vic. 3266
- <http://www.gatewaybbs.com.au>

Springvale Live Steamers Inc.

- SPRINGVALE, Alex Nelson Reserve, Harold Street
- 3rd Sunday
- 110 Patty St, Mentone, Vic. 3194

Steam Locomotive Soc. of Victoria Inc.

- MOORABBIN, 128 Rowans Road
- 1st Sunday
- PO Box 1115, Moorabbin, Vic. 3189
- www.slsv.com.au

Tullamarine Live Steam Society

- BULLA, 15 Green Street
- 1st and 3rd Sundays
- PO Box 107, Tullamarine, Vic. 3043
- www.netconnect.com.au/~tlss

Wandong Live Steamers Inc.

- Wandong, The Dene (off Wallan Broadford Rd.)
- No public running
- 16B Vista Ave., Ringwood East, Vic. 3135

Wimmera Live Steam and Model Engineering Society

- HORSHAM, cnr. Firebrace & Hocking Sts
- 2nd Sunday
- 145 Firebrace Street, Horsham, Vic. 3400

Western Australia

Castledare Miniature Railway

- WILSON, Castledare Place
- 1st Sunday
- PO Box 337, Bentley, WA 6107
- <http://dl1665.tripod.com/cmr>

Katanning Miniature Railway

- KATANNING, all age play area
- 2nd & 4th Sundays
- 37 Amber St. Katanning 6317

Northern Districts Model Engineering Society (Perth) Inc.

- BALCATT, Vasto Place
- Last Sunday
- PO Box 681, Balcatta, WA 6021
- <http://www4.tpg.com.au/users/jimclark>

South West Model Engineers Association (WA) Inc.

- BUNBURY, Forrest Park, Blair Street
- 3rd Sunday
- 10 Clifton St, Bunbury, WA 6230

New Zealand

North Island

Auckland Society of Model Engineers Inc.

- PANMURE, Peterson Rd Reserve, Waipuna Rd.
- Every Sunday (weather permitting)
- PO Box 14570, Panmure
- www.asme.org.nz

Hamilton Model Engineers Inc.

- HAMILTON, Minogue Park, 24 Tui Avenue, Forest Lake
- Every Sunday
- 51 Alderson Road, Hamilton 2001
- <http://communities.msn.com/HamiltonModelEngineers>

Havelock North Live Steamers & Associates Inc.

- HAVELOCK NORTH, Keirunga Gardens, Pufflet Road, Hawkes Bay
- 1st and 3rd Sundays
- C/o 2 Ashford Place, Havelock North 4201

Hawkes Bay Model Engineering Soc. Inc.

- NAPIER, Anderson Park
- Every Sunday pm
- 22 Gilray Avenue, Napier 4001

Hutt Valley Model Engineering Soc. Inc.

- PETONE, 6 Marine Parade
- Every fine Sunday
- Marine Parade, Petone 6008
- <http://www.steammachine.com/hvmes>

Kapiti Miniature Railway & Associates

- PARAPARAUMU, Marine Gardens Railway, Raumati Beach
- Every Saturday and Sunday
- Box 296, Paraparaumu 6540

Maidstone Model Engineering Soc. Inc.

- UPPER HUTT, Maidstone Park.
- Every Sunday (pm) Oct - April
- 95 Holdsworth Avenue, Trentham

Manukau Live Steamers Inc.

- MANGERE, Mangere Centre Park, Robertson Road
- Every Sunday
- Box 43-095, Mangere Town Centre, Auckland 1730
- <http://manukaulivesteamers.orcon.net.nz>

New Plymouth Society of Model Engineers

- NEW PLYMOUTH, Cnr Lizardet and Gilbert Sts.
- Every Sunday
- 11 Gilbert Street, New Plymouth 4630

Palmerston North Model Engineering Club

- PALMERSTON NORTH, Marriner Reserve, Marriner Street
- 1st and 3rd Sundays (weather permitting).
- C/o 22b Haydon St, Palmerston North, 5330.
- <http://www.pnmec.org.nz>

Rotorua Society of Model Engineers

- ROTORUA, Te Amorangi Museum, Robertson Avenue, Holdens Bay
- 2nd Sunday
- Box 7108, Te Ngae 7108

Tauranga Model Marine and Engineering Club

- TAURANGA, Memorial Park
- Every Sunday.
- 326a Devonport Road, Tauranga 3001

Thames Small Gauge Railway Society

- THAMES, Brown Street
- Every Sunday (pm)
- C/- 202 Rolleston St, Thames 2801
- <http://homepages.paradise.net/sjames/>

Wanganui Model Engineering Society

- WANGANUI, 70a Alma Road
- Unknown
- 70a Alma Road, Wanganui 5001

Whangarei Model Engineering Club

- MAUNU, Heritage Park, Highway 14
- Unknown
- 8 Alamein Road, Onerahi, Whangarei 0101

South Island

Ashburton Steam and Model Engineering Club

- ASHBURTON
- Unknown
- C/o 34 Bathurst Street, Ashburton 8300

Canterbury Society of Model Engineers

- CHRISTCHURCH, 26 Andrew Crescent
- 1st and 3rd Sundays
- PO Box 33294, Barrington, Christchurch
- www.csmee.org.nz

Christchurch Live Steamers Inc

- McLeans Island Road
- 1st and 3rd Sunday
- c/- 39 Dunanran Street, Christchurch
- www.websnz.com/tt/clsi.php3

Gore Model Engineering Club Inc.

- GORE, Hamilton Park, State H'way One
- 3rd Saturday (pm)
- C/- 49 Hamilton Street, Gore 9700

Marlborough Associated Modellers Society Inc

- BLENHEIM, Brayslaw Park
- 1st Sunday
- 8 Arthur Baker Place, Blenheim 7315

Nelson Society of Modellers Inc.

- NELSON, adjacent to Tahunanui Beach, Walkare St, Tahunanui
- Every Sunday (pm)
- PO Box 810, Nelson

Otago Model Engineers Society

- DUNEDIN, Kettle Park
- Last Sunday (pm)
- Box 2613, Dunedin 9030

Picton Society of Model Engineers

- PICTON, Foreshore
- Unknown
- C/o 42 Wairau Road, Picton, 7372

South Canterbury Model Engineers

- TIMARU, Anzac Square, Craigie Ave.
- Last Sunday
- C/- R Davidson, 23 Aviemore St, Timaru.

Southland Society of Model Engineers Inc.

- INVERCARGILL, Surrey Park
- 3rd Sunday (pm)
- Box 216, Invercargill, 9530

This listing is also to be found on our website —

<http://www.ameng.com.au>

if your club details are incorrect, it is because you have not told us otherwise!

Insert Tooling

by Mike New

I have read many articles in the various magazines relating to the model-engineering hobby over the years and it never ceases to amaze me that so much trivia is still written about the use, care and grinding of high-speed-steel (HSS) or brazed-carbide lathe tools. The application of these tools were, indeed most valid when the prototypes of our models were in regular production in the dim and dank factories of England and elsewhere, and perhaps this approach has been to an extent, propagated by the more mature age of many of the contributors. However in this modern age of PCs and exotic alloys should we not accept that insert tooling is where it is at. Indeed, the use of insert tooling is now being increasingly promoted by our suppliers, inserts and holders are to be found in most used tool and machinery suppliers.

I guess to an extent model engineers have stuck with what they 'started out with years ago' and hence have not thought to investigate insert tooling, thinking that it is the domain of the professional manufacturing engineer and NC user and hence expensive and complicated to understand. This is not the case and it is the object of this article to at least inform those of you who may be considering it's use. In any article of this type one invariably needs to refer to suppliers technical literature and this article is no exception, accordingly I would state now that the author has no commercial interest in any of the suppliers that may be mentioned herein.

Firstly one needs to understand that because of its' general universality in production engineering, an ISO standard nomenclature has been developed which defines both the geometry of the holder and the inserts. Considering the holder, a number of configurations are available as defined by a 7 digit alphanumeric identification sequence printed on the holder and listed in the catalogues. The first digit defines the clamping method, these being a 'top clamp' a 'pin' or simple screw. (vis C.P.S.). The second digit defines the insert shape and there are many! The ones we should concern ourselves with are Triangular 'T' and Rhombic (80°) 'C'. There are in fact some 16 different insert shapes which address all of the machining requirements for both manual and NC work. The third Character defines the type of tool, ie the way the insert fits into the holder to provide the angle of approach for facing or surfacing and there are approx 16 options of which we really need only to consider those appropriate to the two insert shapes we are interested in (Triangular and Rhombic) more about this later. The fourth Character defines the type of insert the holder is designed for and this is important as we can quickly tell whether it is for positive or negative inserts. An 'N' in this position indicates that it is for inserts which have zero side clearance angle. Inserts with this designation are regular square

sided solid polygons. The other designations are from 'A' to 'G' and 'P' and define side clearance angles of from 3° to 30° Inserts with these angles form trapezoidal solid polygons.

In the very early days of the development of 'I-T' the common configuration was to use negative holders and inserts, which worked well for heavy production machining where lots of horse power was available. The phenomenal progress in cutting technology however, has now provided the industry (and model engineers) with a wide variety of grades and geometries to cover all conceivable machining requirements and including many 'positive angle' classifications for light machining and finishing of steels and non-ferrous alloys.

A more extensive and comprehensive description of tooling and insert classification can be obtained by reference to the technical catalogues available from suppliers such as Kennametal, Mitsubishi Carbide, Seco, Iscar, Sandvik and others.

In choosing an 'Insert tooling system' to suit our purposes and needs, requires the consideration of a few options presented to us by the large range of geometries and combinations now available. On the subject of inserts, a brief history of development may be of help. The 'cemented carbides' were developed in the mid 1920s and were the mainstay of metal cutting for many years in the form of the familiar brazed tooling. The development of the separate insert occurred in concert with the development of numerical control and was necessitated by the need for an economical, flexible and consistently accurate method of quickly indexing a new cutting tool or edge with the least affect on productivity and accuracy. Titanium carbide was introduced around 1970. Ceramics were also being introduced at about this time, followed by Cermet in about 1975. Cubic Boron Nitride 'CBN' and sintered diamond quickly followed as the precision and phenomenal increase in spindle speeds and micron accuracy of modern NC machines allowed for the finish machining of hardened steel components and exotic alloys, thus reducing the need for expensive finish-to-size grinding.

Firstly insert shape

The Triangular insert provides for the use of 3 cutting edges and 6 if a negative insert system is chosen. A Rhombic insert provides only 2 edges and 4 for a negative insert. The trade off between Triangular and Rhombic is in the fact that the 80 deg included angle of the Rhombic insert can provide for both facing and surfacing operations from the one tool without adjusting it's position, an initial economic advantage. However when turning to a shoulder it is possible with the Triangular insert to plunge in at the shoulder to slightly under-cut the corner and then come out to form a square clean abutment, this is **not** possible with the Rhombic type. The triangular insert also

allows for one to get into difficult corners that would again be impossible for the Rhombic type. It is also possible to take limited facing cuts with the Triangular tool dependant on the choice of insert. Which brings me to another point to be considered, whilst I stated that the Rhombic tool can handle both facing and surfacing, this is predicated on the cutting edge geometry of the insert chosen. Many inserts are now available which have specific ground edges and included-chip-breaker styles which preclude them from being used in both directions, but which are very suitable for our purposes in that they produce very smooth finishes on fine cuts. A variation of the Rhombic shape is the 35° style or Diamond shape, sometimes referred in respect of it's holder, as a copying tool, simply because it can produce some interesting profiles without resetting. It does also allow us to get into the end of small dia. work supported by a center. However it does have a fine point and is not really suitable for the range of machining operations that we are likely to subject it to, in my judgement.

Negative or Positive that is the Question

In setting out to write this article I did not anticipate the amount of research or phone calls to suppliers in order to clearly understand the very large matrix of options and combinations presented by the choice of styles and inserts differently available from the various suppliers.

With the large range of insert tooling now available this issue is not obviously decided, although I would tend to go for the 'Positive' option for those people using Myford sized lathes where the shank size of 12 x 12 mm can be obtained from your chosen supplier. For the larger lathes the 'Negative' holder and insert is an option as they are now available with angled and ground cutting edges in 'Cermet' grades, which produce very smooth finishes.

With a negative insert the sides of the insert are square as stated earlier and so therefore the insert must be positioned at a negative angle with respect to the top level of the tool for effective proper clearance when machining. In other words the insert is angled downwards, which is the opposite to what we have always read in 'our books' on machining! This angle varies from 3° to 8°. However, this negative angle is compensated for in part, by the moulded or ground cutting edge geometry of the insert and does allow for the use of 6 cutting edges, in the case of the Triangular insert, providing economy of usage.

For those considering positive tooling, the insert angle when seated in the holder, can vary from 0° to 10°, although any angle above 5° is generally for special inserts for the machining of Al and other non ferrous alloys, for finishing and fine cuts in our scales however these inserts would be

mostly useable. For the general machining of steel, CI and non-ferrous alloys the 5° holder should be chosen. (The actual angle of the insert seat is in fact 0°.)

Insert grades

Inserts come in a vast variety of grades and chip breaker styles to suit all materials. I have a personal preference for the uncoated 'Cermets' as these are resistant to weld build-up on the tip, produce a smooth finish on fine cuts, and are available in a ground grade for even finer work. Mitsubishi Carbide, Kennametal and Sandvik are some of the companies that supply these inserts. The uncoated carbides are also suitable for our work.

As a cutting material, cermet sits at about the centre of the Hardness versus Toughness spectrum, and in its uncoated form I believe represents the optimal choice for our use, in that it can be obtained in positive styles with ground edges. Coated inserts I believe have little application in our range of uses for the simple reason that our lathes do not often have the spindle speeds or power required to take advantage of them or to produce the better finishes with the small cuts that we tend to dial up when creeping up (down!) to a final size. The uncoated cermets do provide all the advantages of being able to take finer cuts at the slower speeds, and still produce very good finishes. They are of course, excellent at their rated surface speeds of 200-300 M/min at feeds of 0.1-0.3 mm/rev. This translates into about 1,200 rpm for a 50 mm Dia steel workpiece! with little if any extra horse power required. They will also cope with SS and CI and of course their sharp positive profile allows for the easy machining of Al and the copper alloys. A word of caution however, cermet is more brittle than HSS, so do not abuse it when carving into CI, or with interrupted cuts. The above is not to the total exclusion of other grades, coated or otherwise; these can most certainly be used for roughing especially where you may be able to buy them for a few dollars a time from your local used tooling supplier.

Insert Styles or Types

This generally refers to the geometry of the incorporated chip-breaker and cutting edge and whether the insert has a hole for a clamping screw, or is plain for use with a clamping-type holder. Insert tip-radius is also a consideration. As with the holder, Inserts are classified by a 10 digit alphanumeric field and are clearly described in the technical literature for the particular manufacturers product. The coding here may vary from one supplier to another so be careful if comparing types. Inserts are also defined for use in LH or RH machining, where the chip breaker geometry precludes the use for both. For boring of course we will generally require the LH type (as for facing)

Shank Size

This defines the square size of the holder and is designated by a 4 digit number in the classification code, these are 8,10,12,16,20,25 and larger. Some, but not all suppliers cater for the smaller shank sizes in the positive styles. Kennametal indicate

sizes 8,10,12 upwards. A typical positive insert holder code would be "STGC1212N11". This defines a screw-on-fixing 'S' for a Triangular insert 'T', Turning holder 'G', will accept 7 deg inserts 'C', with a 12 x 12 shank which is 160mm long 'N', and uses 11mm size inserts. 11mm refers to the side of the triangular insert in this case.

Clamping Options

Once again you have a choice of how the insert is held in the holder, for our use the positive clamp is preferable as this does allow the use of a wider range of inserts which we may come across in those tin boxes in used tooling stores. An insert with a hole can be held in a 'top clamp' type holder for instance. It is at this point that we must make a decision. Most suppliers only provide their 'positive' holders with screw type clamping (for screw-on inserts), Mitsubishi supply their triangular holder with top clamp but only in shank sizes 16 upwards. These can however be machined down to 12x12 for those who would prefer the flexibility of top clamping and are happy with triangular inserts. Plain inserts without holes also tend to be less expensive.

For this option the holder would be CTGPR1616H11 with a TPGR110304R cermet ground insert grade NX55 uncoated for finish cutting; or TPMR110304 standard cermet for medium cutting.

The actual angle of the insert seating is defined as 0° in the catalogue, so the designation of 'C' (for 7°) really means that you could use any insert that has at least a 7° positive clearance angle. For all other holders in positive form you will need to accept the screw-clamp style. For instance a 10mm square shank holder for 80° Rhombic inserts from Sandvik would be SCLCR1010E06 with the new cermet CCMT060204-WF insert, grade CT5015. This combination could be used for turning and facing. A word of caution, because some parts of the world don't yet know about French Inches you may find that some holders you come across won't fit a given insert, this is because they are imperial sized, not so much of a problem if the holder is of the top clamp style. You will also see the insert size defined as the dia. of the inscribed circle of the insert shape in some of the technical literature.

Boring bars

The same selection criteria applies equally well for boring bars although the options are far less, in our sizes choose positive tooling where possible with smaller tip radius as this will reduce chatter. Mitsubishi Carbide have recently introduced their 'Dimple Bar' (sounds like a choc ice!) which purportedly provides for a greater diameter-to-radius ratio for the smaller sizes. It was designed on a computer using FEA to minimise vibration.

Some general observations

The use of insert tooling is far superior to HSS and eliminates all the mucking around trying to regrind the required edge to get the same results you obtained before it got blunt 2 hours ago! However, ideally it does require higher spindle speed ranges of the order of 30%, which are now available on the newer lathes coming out of the

Asian countries. Rigidity is important as with all machining but is less so now in our sizes, with the advent of the positive inserts. I do know of people who have tried to use insert tooling on the basis that they inherited or were given some tool holders and a bunch of old inserts and were not impressed with the results, proclaiming that inserts do not work for model engineers, I am not surprised. This uniform approach is akin to throwing a bunch of circuit boards into your PC and expecting results. Doing ones homework in this increasingly technological world surely is part of what our hobby is all about.

On the subject of prices, the sale of insert tooling is not really a retail activity and sales are generally made directly to the industry end-user at the defined prices so don't hassle the sales guy on discounts although they are often offered. Unfortunately some suppliers are now only selling inserts in boxes of 10 whilst others will supply packets of 5. This does increase the investment cost a little, however if two or more people co-operate or go through their club, the problem can be solved.

Parting-Off tools

Once again and particularly in this operation inserts can come to our aid most definitely, parting off is a difficult operation at the best of times. However no amount of playing around with absurd angles or putting things upside down will do anything whatsoever to solve the basic and fundamental problem when parting off; and that is that the chips will always tend to get caught up in the groove causing nasty things to happen. The parting off tool and insert, which I believe was originally invented by Iscar some 20 years ago or more, cannot be beaten. The chips are caused to roll up on both sides by the geometry of the insert before moving across the parting groove allowing free and easy exit and thus trouble free parting off. A number of suppliers now offer these tools in various sizes although most of us will only require the smaller sizes using the 2mm wide insert and which will handle up to about 85mm Dia. These units are not inexpensive, but an economical unit is available from Hare and Forbes, which I believe is made in India.

In summary, I hope the foregoing has served as a guide to those who may have been considering the use of insert tooling, or just want to learn more about it. If you are serious about buying a unit then get hold of one of the supplier catalogues and study it, you will then be in a position to make an informed decision on which way to go when discussing with the sales person. Do not just go out and buy a holder and some inserts on the basis that Johnny at the club said they were a good buy! Some combinations of holders and inserts are now being stocked by Model Suppliers. When phoning a supplier explain to the sales person who you are and why you would like a catalogue, these are generally supplied for free, and the sales person is more used to talking to professional engineers and would not like to think he is wasting his time dishing out literature to the casually interested.

Attaching Pistons to Piston Rods

by Ed Murrell

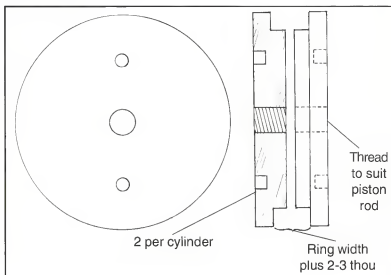
I have built 14 locos with pistons attached the way I am going to describe, with no trouble from any of them. I removed one piston and replaced it after it had been in service for 7 years. It was like new.

Take a $\frac{5}{16}$ " stainless rod, and screw 32 threads, a few threads more than the width of the piston.

To make the pistons, part of the discs required, two per cylinder, leaving an allowance for finishing. Face one side and drill and tap for the piston rod. Now hold a piece of round material, 25mm dia, more or less in the 4-jaw chuck (they hold better and might not be disturbed), turn a spigot on the end and thread it to take the piston blanks. They can be finished to size, but remember you can remove metal but it can't be put back! Also they can be returned to the fixture.

Two holes are drilled in the outer faces for 2-pin spanners. Don't drill right through — if you do a disc of shim brass will be needed when the discs are tightened together to stop a possible blow-through.

The rings are fitted with 2 or 3 thou side clearance.



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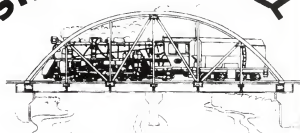
Hamilton offers a wide variety of accommodation — hotels, motels, camping grounds with cabins, as well as bed & breakfasts. A list is available on request.

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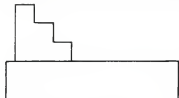
Making Eccentrics

by Phil Gibbons

Drawings for publication from the author's originals by Dave Adams

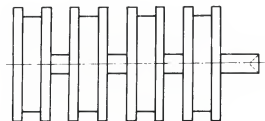
I will describe how I manufacture eccentrics quickly, and more importantly, all to the exact same throw.

The procedure is the same whether you have 1 flange or 2. Chuck a piece of bar long enough to turn and part off all 4 and enough to grip by the full length of the chuck jaws. This is important so as to avoid dig-ins and broken tools.



Hang the bar out far enough to turn and part off all 4 without moving the bar as shown here (left).

Turn the finished OD of the flange. If they are single flange, don't centre the end of the bar, turn the OD of the eccentric, part off, flange oversize face the next one. Repeat for all other eccentrics.



If double flanged, put a very small centre in the end of the bar (not deep). Turn the bar with centre in it as shown in this sketch (left).

Part each eccentric $\frac{3}{4}$ of the way through the bar. Leave one side oversize by $\frac{1}{32}$ " and the other by $\frac{1}{16}$ ". Turn and finish the groove as described below.

Tip: To get a mirror finish on steel, use a HSS tool to rough out, use the same tool to finish but first regrind or touch up the tool and hone the cutting edge lightly. Use a very fine stone.

To cut the groove, put the lathe into its slowest speed; you may even have to pull the belt by hand. The slower the better — use raw cutting oil and plenty of it, or heavily oil coolant. Take very small cuts in depth. You should be able to plunge cut with a full width tool.

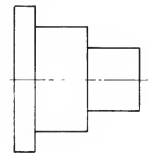
Do all four to the same dial reading. The actual ϕ is not important as long as it is within .005" to .010" of the drawing size, but they must all be the same. So if you go undersize on one, machine the rest to suit.

Face to size on one side and part off. Repeat 4 times.

Next a jig is required in steel, brass or iron — at least $2\frac{1}{2}$ times the eccentric width and $1\frac{1}{2}$ times ϕ round.

Machine the OD true up to the chuck jaws. Turn a step around $\frac{1}{4}$ " long and about $\frac{1}{4}$ " deep as shown at left.

Reverse the jig in the chuck.

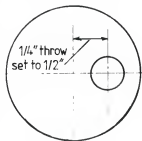


This time use a 4 jaw

and hold the jig by the step you just turned. Set it to run out by twice the eccentric throw on your drawing.

Example: Dial gauge should read at jaw 1 — 0" at Jaw 3 — 0.500"

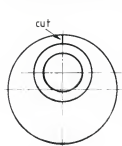
Set Jaws 2 and 4 read the same.



Set using the previously turned ϕ marked * in the sketch at right.

Now bore the recess marked "XXX" to suit the finished ϕ of the eccentrics, plus .001" - .003" oversize in depth. Bore a slightly smaller hole right through the jig to allow it to be squeezed.

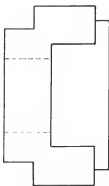
Take the jig from the lathe and cut a slit through the thinnest part of the jig as shown below.



Now put an eccentric in your new jig and the jig into the 3-jaw chuck.

With the jig slit in between two jaws,

tighten firmly to grip the eccentric. Drill through the eccentric and bore to a tight push fit on your axle ϕ .



Easy now! If the eccentric moves in the jig it is near impossible to get it back right so no rough stuff.

Face the eccentric to the correct width and remove jig from lathe, but before removing the eccentric from jig, scribe a line from the jig slit to the centre of the bored hole — we will use this later when we drill the eccentrics for grub screws.

Repeat for the other eccentrics. All will be as accurate as your 3 jaw chuck. A .002 or .003 run-out will not matter.

(This item reproduced from Steamlines, the journal of the NDMES, Balcatta, WA)

Handy Hint

For cutting s/steel or mild steel try using a cutting disc (SG. Elastic My preferred brand), either 4.5" or 5" depending on your angle grinder.

I have found that I can make cuts quicker and straighter than with a hacksaw. As these discs are only 1mm thick they cut easily but should be handled with care.

— Mal Eggs

Useful Computer Program

The following is part of a letter received at the AME office ...

The enclosed disk contains a program setting out details of B.S.I. recommended metric alternatives for number and letter drills which I wrote some years ago. Just enter the number/letter and bring up the data relating to the metric alternative.

— part of a letter from L Wilkinson (WA)

If you would like a copy of the program either send in a blank disk or email me and I will email it back to you ... Ed.

New Plymouth SMEE Inc.

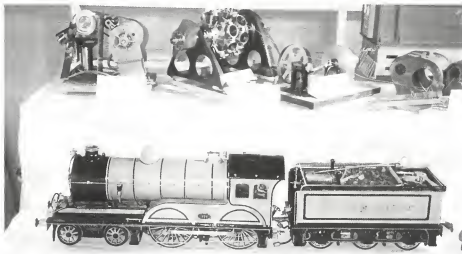
Story and photos by Murray Lane

The New Plymouth Society of Model & Experimental Engineers celebrated their 50th anniversary over Labour Weekend 26-28th of October. Labour weekend is the traditional open weekend for this club, but due to the anniversary more visitors than usual made the effort to attend. In spite of a rather dismal early forecast the weather was fine for most of the three days and those who attended enjoyed the celebrations.

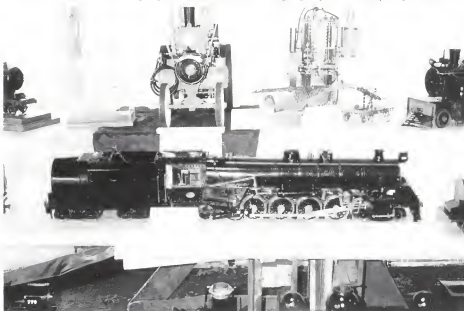
New Plymouth is located on the seaward side of Mt Taranaki (originally named Mt Egmont), half way up the western side of the North Island of New Zealand. It has a moist climate, which is very suitable for plant life and as a result has many notable gardens.

The society was formed in 1952 and approached the New Plymouth City council for a suitable ground to build a track. They rented the present small site, which is in a prime location at the entrance to the world famous Pukekura Park, and it is only a few minutes walk from the centre of the town. In conjunction with the NP chess club, a clubhouse was built, and a track followed in short order. Many improvements have been made over the years and the over and under standard double loop, has operated every Sunday except when weather conditions have prevented running. Many fourth generation and some fifth generation families keep returning with their children for rides.

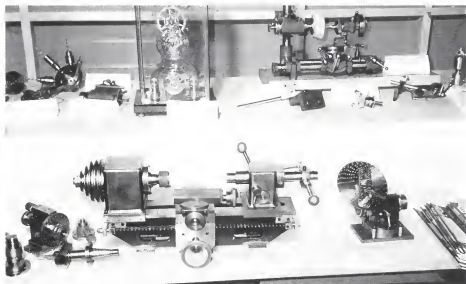
To celebrate the occasion an exhibition was set up with a total of 98 items on display. These included the old models made in the early days of the club, which have been on display in the club rooms for well over thirty years. It was interesting to compare these models with the more modern items, the two main differences being the increase in size and standard of workman-



Miss 10 to 8, a LBSC design of a NER Atlantic in 3 1/2" gauge by Ken McIntyre of Blenheim



2 1/2" gauge NZR J 4-8-2 built by Bob Findlay



3 1/2" lathe designed and built by Phil Mawson from NPSMEE

ship.

Also of note were the following:—

- 8 day skeleton clock with grasshopper movement built by Gerry Gerrard from the NPSMEE.
- A 5" PV Baker based on a Springbok chassis built by the late George Sutherland from the NPSMEE.
- John Wilding's large wheel French 8 day skeleton clock being made by Ted Gates of the NPSMEE.
- A nearly completed 5" NZR Wa, being built by Jim Clark from Wanganui.
- An Air Pull tractor powered by a hot air engine built by Bruce Geange from Palmerston north. Bruce was that impressed with the two American versions at the 2002 convention at PN that he decided make one.

Due to a full page article with two photos in the Saturday issue of the local paper,



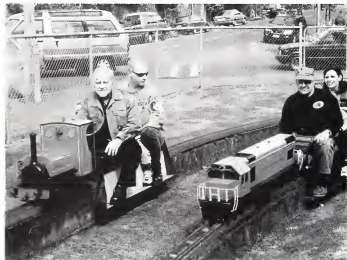
Gerry Gerrard's beautifully made 5" gauge Beebe River Railroad Shay, built to the original manufacturer's plans.

the visitors and local club members were kept busy giving rides to the never ending queue of passengers.

On Saturday afternoon many of the visitors were taken by bus to Inglewood, to visit a museum of toys made by 'Fun Ho', which ceased manufacture in 1982. It was interesting to see the dies and machines, which were used to produce these cast toys. Originally these were cast in sand, and this method was superceded by gravity castings in metal dies and finally by pressure die casting. This evolution saw a steady improvement in the details of the finish. Over a period of 55 years there was a very large variety of models made in several sizes, most of which were scale models of vehicles or animal figures. The club put on a barbecue that evening.

On the Sunday afternoon a full bus load of visitors were taken to Ted Barnes's property on the lower slopes of Mt Taranaki, to see his 7 1/4" track. The track is laid on a continuous concrete plinth, and Ted has just extended the original small loop, with a larger outer loop, giving total length of 400 metres. Due to the direction in which the visiting steamers were loaded in the vans, they had to run in the reverse direction, which tested the drivers skills, as there was an up hill grade of 1 in 27. Normal clockwise running has a maximum grade of 1 in 35. In Ted's workshop was a 5" electric powered model of the older 508kw NZR Eo Bo-Bo built by English Electric. These engines operated through the 8.6 km tunnel between Arthurs Pass and Otira from 1923 to 1968. In 1968 the more powerful 960kw Toshiba Bo-Bo-Bo, Eo replaced them. Also on the bench were two bogies with four geared motors in each, which will sure make a very powerful locomotive. Ted is also in the process of building a Phantom.

Most visitors and local club members attended the anniversary dinner held in the Pukekura kiosk restaurant that night. Gerry Gerrard, the only surviving foundation club member was presented with a memorial pewter mug, to mark the occasion.



Jim McLean at the controls of Bill Parker's Holy War, alongside Dave Giles with battery powered NZR D built by the late Graeme McCarthy



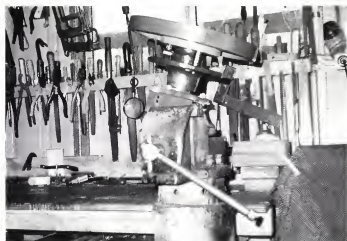
In the steaming bays Jim Clark can be seen preparing his Torquay Manor for a run on the track. Alongside him is Peter Carr's Gresley A4



At the top of Ted Barnes' track on the mountain slopes behind Inglewood

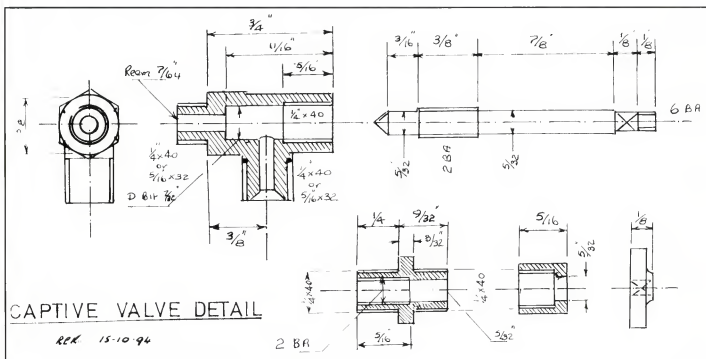
by John Robson

Tilt the device in the vise and the heavy part will swing to the bottom. There are different sizes of stub axles so a scrounge around the local junk yard will probably come up with one to suit different sizes of holes in face plates.

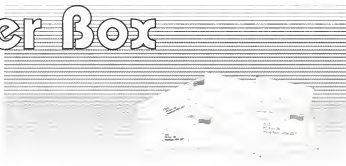


Article and drawing by Bob Kimber

Construction of such valves was covered comprehensively by Lawrie Lawrence in *Model Engineer*, Volume 144, No.s 3595, 3597 and 3599 of 1978.



Letter Box



Small Hit and Miss engine

Sir,

Re article titled *Epoxy Sand Casting — Small Hit & Miss Engine* (AME #106)

I would like to congratulate Stu Martyn on undertaking the building of his Hit & Miss engine using the limited information I gave in my article in AME issue 50 (Sept-Oct 1993).

I'm pleased the article inspired him to have a go — after all, it's a change from steam. Although I made my own patterns there was no way I would have attempted to make the castings. I'm afraid I chickened out and left it to the experts.

Congratulations once again, Stu, on a job well done and thanks for the acknowledgment. I hope you get as much pleasure running your engine as I do mine. They're fascinating to watch and hear.

Russell Paynter

New South Wales

Foundry articles

Sir, I would like to thank the Editor for printing the two foundry related items in issue 106. It was good to see that Stu Martyn made his own patterns, moulds and melted the metal for the moulds, as most model engineers avoid doing any foundry work at all. Like Stu, I went to foundries to find out about their methods and was greeted with a wall of silence. The way to overcome that problem is to read as much as you can on foundry work and don't be afraid to experiment with different methods to get the results you want. I can assure Stu that green sand can give as good a casting as resin sand can if properly made and is the cheaper option. Foundry work can up a host of new directions to a model engineer who is limited to what he has got in the scrap box. Stu, if you need help in any way just write to me via the Editor. Now I have read your article I hope to build one myself.

Ernie Henne

Victoria

Parting off

Sir,

I was somewhat disappointed to read the letter from David Nance in issue 105 of the AME concerning his sad experience with the Kit-Q-Cut parting-off tool. There would be only a few reasons for this sort of failure of an insert. (1) Being of his own admission, not an experienced or highly skilled machinist, he most likely was running the

spindle speed far too low for clean parting-off with an insert tool. With a 25 mm lump of BMS you should be able to carve it up at greater than 750 rpm! on a lathe in **reasonable condition**. Inserts do not like very slow surface speeds and probably what happened is that if David was running at his normal slow speed for a HSS parting tool then this would have the effect of abrading the surface such that on subsequent cuts the insert would eventually just chatter.

(2) His lathe is far too slack on the slides and feed screws; inserts are tolerant of vibration caused by a loose machine however the limits are somewhat less than for HSS. The insert advertised by Greenwood tools is a grade 4125, this is a PVD coated grade and is a tough all-round insert suitable for most materials but does need to work hard. I do not recognise the form of the insert holder/blade from the picture in the advert, if this is a 'special' unit and not an 'original manufacture', then this could also be the cause of his problem. Most insert blades from the major manufacturers are double ended so David should not have to throw the blade in the waste bin! I have recently submitted to our editor, a short 'treatise' on the use and selection of insert tooling for our purposes, which may serve to avoid disappointment of this sort in future (see page 55 ... Ed.).

Michael New

New South Wales

Sir,

Having read the letter in the last issue from "David Vance in Victoria" on parting off, I can assure him he is not alone. Parting off was the bane of my existence as an apprentice and nothing has changed now that I have my own lathe at home. Recently I bought a reverse parting tool from D&P Burke Toolmakers (Diamond tool holders) and a very nicely made tool it is. All went well for a while and then parting off one day came the crunch and bang. The usual things like drive slipping, tool snapping didn't happen. The dovetails on the compound slide gave way, which I suppose turns this into a cautionary tale for the owners of cheap Chinese lathes. The spares are available but at a price. Thankfully I have a compound slide off an old Grayson lathe that I have been using as a vertical slide so this has been pressed into service bolted to the old compound rest with the remains of the dovetails cut away.

Ian Jobn

Western Australia

Buzacott help needed

Sir,

I'm enquiring if anyone has any info. photos, drawings, etc. regarding an old horizontal oil engine — nameplate states "Buzacott No. 4793 HP 2 1/2". I have the cylinder block, flywheels, crank shaft and gears with a view to restoring.

Shane Brydon

Queensland

(If anyone can assist, please contact Shane via the AME office ... Ed.)

Garden railways

Sir,

Reading David Wecombe-Down's article "Getting started in small scale live steam" in Issue 105, it is obvious that he has been in this game for some time, and came to it the hard way, but I believe considerably easier paths have opened up in recent years for beginners than the course David has expounded on in his article.

Firstly, could I sound a caution with respect to the Mamod engine. These have been built to comply with EU legislation covering children's toys, which severely compromises their steam raising capacity with evil smelling solid fuel tablets and safety valves that operate at 14.7 PSI. They tend to have only two speeds, Warp 3 and stop and it's mostly the latter. A whole industry grew up and still continues to this day providing replacement boilers, replacement safety valves, replacement wheels, replacement cylinders, in fact just about replacement everything (see IP Engineerings website: <http://myweb.tiscali.co.uk/ipengineering/> for example) to try to make them work properly but by the time you have gone down that route you could have purchased one of the many properly engineered entry level engines now on the market and have some change left over. Examples in this latter category include the Accurcraft Ida, the Roundhouse Mille or Bertie or the Australian made Argyle Bantam.

And while I have always been impressed by the Gauge One 1/32 scale layouts with their wide sweeping curves, the reality imposed on most of us by modern backyards is that we need something that will operate on tracks with smaller radius curves. This is where the scales modelling narrow gauge prototypes on 32mm and 45mm rail come into their own. And it is not only a consideration of fitting some track in your backyard. LBSC when constructing engines in Gauge 0 or 1 used to describe the work as watch making. Engines built to 16mm or 1:20.3 scale tend to be a little roomier and probably move you up into at least the clock making category.

Could I suggest following resources as areas worthy of a look for somebody considering starting out in this area:

www.argylelco.com.au

Argyle Locomotive Works

241 Belgrave-Gembrook Road

Clematis VIC 3782

Gordon Watson at Argyle as well as being a renowned builder of small-scale live steam engines for the Australian, US & UK markets and a really nice guy is also an Australian agent for Aster, Roundhouse and Accurafits engines. He also runs a market place for second hand engines and rolling stock. All you could ever need from the one source. I do not have shares but I am a very satisfied customer.

www.roundhouse-eng.com

Roundhouse is a UK manufacturer whose engines are held to be the last word in reliability. Their site is worth a visit just to have a look at their Darjeeling B class engine, which I have lusted after ever since it came on the market. While you are there, take the factory tour and check out their history.

www.16mmngmodellers.org.uk

Membership Secretary Bruce Flaxman

40 Grain Road

Wigmore, Gillingham, Kent ME8 0ND
UK

I am a member, so probably a bit biased but they produce a quarterly magazine *16mm Today*, which has a lot of good content including construction articles. Their website also provides some interesting links.

Brian Hardy

Victoria

Cotton reels and slippage

Sir,

The object of the cotton reel experiment with it's surprising result was to find the relative slip of two flat treaded wheels on a fixed axle on a circular track. The results could then be applied to railways after the added effects of coning, flanges, shift in weight distribution due to centrifugal forces, super elevation and the slewing when an assembly of wheels on fixed axles are all included. The problem of the simple radial one axle assembly would have to take friction into account and, without actual figures, a change in friction with velocity may have to be assumed.

The gramophone turntable was used for convenience, as it does not matter if the wheels move on a stationary track or as with the turntable, the track moves under the wheels. In either case the outer wheels have more travel on the track.

The obvious answer is that the slip of the two wheels must be equal and opposite but this does not appear to be the case. Warwick Allen gave a hint that he has a solution with the throw away remark that an increase in speed causes a reduction in force. Does this pre-suppose that equal work is done by or to the two wheels?

Hopefully a Mechanical Engineer with a theoretical type background can come up with a full explanation of why the rpm of the cotton reel mounted with it's axis radially on the turntable was mainly controlled by the inner rim (equivalent to the inner wheel).

Ted Crawford,

South Australia

Electronic welding helmets

(This is a small segment of a letter, which dealt mainly with other matters ... Ed.)

Sir,

I would like readers to know that the price of electronic welding helmets is coming down. I saw at least three at the (recent) Orange National Field Days at around \$149. Some even had variable darkening control at this price. All were Chinese and had two sensors with solar cells. What none specified was the switching time. However, Hare and Forbes were using a Zeluc™ on their stand and said there was no problem with switching time. I did not try it.

Another brand is Opto™ and this is currently on sale at Mitre 10 stores for \$149, complete with darkness control. But I also saw some at over \$800! I don't know what justified that price but personally, I would expect built-in hi-fi and air conditioning.

Peter Davies

New South Wales

Conventions and boilers

Sir,

Re the Convention and the usual boiler meeting, as a model engineer of almost 50 years, I think the boiler has been discussed enough and the various codes and amendments are more than needed, so what I suggest is that instead of having the usual meeting, the boiler committee actually construct a boiler.

A member of the host club who is constructing a locomotive, preferably with a copper boiler, for the first year (could) supply or fund the purchase of materials for a boiler and the boiler committee actually construct it during the convention. I am sure the necessary tooling would be available from members of the host club.

By doing this and making the construction open to all visitors to the convention, who can either observe or put their overalls on and help, this will widen the knowledge and create expertise necessary to construct a boiler, and in so doing, make new members to our hobby more confident in regard to the construction of future boiler; which will be safer because of the expertise gained and not be such a frightening project. I ask how many chassis run on air but the boiler is never built and the project never finished.

Perhaps the next year a steel boiler may be constructed and other parts of the hobby, say a small foundry may be in action where visitors can bring along patterns and have a go at casting them (this is not difficult as many members have a small foundry in their back yards).

In this way we would encourage new members that the hobby is possible and break down the vision of somebody looking at the latest, biggest, most detailed model, which is a credit to the constructor, but looks daunting and impossible to the average person.

Ron Hewitt

Queensland

Gear cutting

(This letter arrived some months ago and was overlooked — apologies to Colin ... Ed.)

Sir,

I was interested to see in the AME (March/April '02) an article by Mr Young describing gear cutting using a shaper. However, I feel that he passed rather lightly over as to the mathematics of selecting his mandrel driving gear train.

There is also a simple way of doing this which was described in *Model Engineer* Vol. 103, p101 (14 December 1950) *Gear Cutting with the Shaper* by "Base Circle". This is the method I used to machine the spur gears for the 2" Fowler road engines and is described in *ME* Vol. 162, p110 (20 Jan 1989).

Thanks for a good read.

Colin Bamford

South Australia

Rail head radius

Sir,

I refer to *Letter Box*, issue 53, page 48 where Alex Russell of Vineyard, NSW refers to wheel and steel rail profile. AALS Track and Wheel Standards call for a rail-head radius, as they should for 7 1/4" gauge at least. The 7 1/4" Society of Gt. Britain do the same. Prototype a miniature F/B rail has it rolled in as a matter of practice.

No engineer can tolerate the situation your writer describes and I find to my dismay that a new 7 1/4" gauge mainline steam express passenger locomotive which I am about to commission cannot run at the next convention or on 95% of Australian 7 1/4" tracks.

How is this possible, and what are clubs going to do about it? I wonder will the response be — deathly silence such as has been since Mr Russell's letter and your then Editor's comments; or will the next eight years see the matter corrected?

Robert W Elliston

Victoria

(I share the views of my predecessor on this matter, but the problem is not an easy one to rectify. Few clubs would be in a financial position to replace their existing track, and the practice of running coned wheels on flat rail has become an entrenched part of the miniature railway scene. In my experience this is also the situation with many overseas club owned tracks I have visited. Where cost is not a consideration some larger clubs and many private operators do use profile rail. Your thoughts? ... Ed.)

Letterbox Contributions

You are welcome to send letters by mail to: PO Box 21, Higgins, ACT, 2615 or fax to: (02) 6254 1641 or e-mail to: amemag@bigpond.com

As far as possible, AME is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion as long as they are not libellous will be considered for publication.

News Desk

with David Proctor

Hello and welcome to the second issue for 2003. If you have read the Comment column you will be aware that this issue was prepared under conditions somewhat different to normal. My apologies to those who were expecting material to appear in this issue which has not made it — you will be in next time.

Back Issues

Observant readers will have noticed that all issues from #1 through to the last issue are now in our Back Issue listing and available from **AME Retail**. We have found a place where we can have reprints done at a reasonable price and in most cases they are indistinguishable from the originals. The exception is the original series from #1 to #32 which are now printed at A4 size, the same as all issues from #33 to the present time. To my mind the quality of the reprint and the slightly larger size actually make them easier to read. They are slightly dearer than other back issues but this is a result of the printing cost. John and Phyl Oliver are waiting for your order.

While we are talking about AME Retail, I believe they have a limited number of railway calendars left and have reduced the price to clear them. See ad. on page 66.

Club records

Whilst I was trying to update the club listing for this issue I was surprised by the number of clubs who had not bothered to notify us of changes as they occurred. Apparently the belief is that AME can get the current information from AALS records. I thought I have already made it perfectly clear that this magazine has nothing to do with AALS or any other organisation and that means we have no access to their records, we don't want any, and they have no access to ours!

General enquiries

The number of letters and other communications I receive from people wanting information on all sorts of topics has grown markedly in the last few months, and this is not letters which come in for publication in the magazine. I am finding it increasingly

difficult to find the time to answer all the communications I receive as well as to produce the magazine. Some of you may wait a long time for your answer as the magazine has to come first.

If someone would like to volunteer their services and feels able to answer questions ranging from raw beginners to fairly technical, I would be pleased to hear from you.

Help wanted at AME

As well as the appeal for assistance in the last paragraph, there is another area in which I desperately need some assistance. I need someone to compile **Club Roundup** for publication. The information is gleaned from club newsletters plus emails and faxes. The ideal person for this job would have a computer with email access and be able to meet the deadline every second month. They would also treat as confidential some material they see as not all is meant for publication. It is not a difficult job, but takes more time than I have available. If you would like to have a go give me a call.

Trade and commercial

The well known firm of **Scobie & Glover** ceased operation as at the end of 2002. However, Barry is still supplying all his detail bits and pieces as he always has, but now under the name of **Barry Glover**. See his ad on page 8.

Mark Whittaker

Finally, word has just reached me that the founder and first editor of AME, Mark Whittaker, is seriously ill. Our thoughts are with him and his family.

Until next issue, keep modelling!

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- Wanted — *Light Steam Power* mags and *Audels Engineers and Mechanics Guide*. For sale — *Model Engineer, Railway World, Railway Magazine, Modern Railways*. Ph. (03)5126 2202

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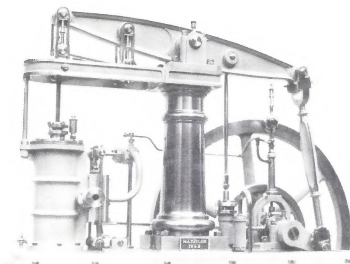
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